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Delaware

LTPP Specific Pavement Studies

Construction Report on
SHRP 100100, SPS-1 Project,
Ellendale, DE,
Spring 1994 - Fall 1995

Report No. FHWA-TS-96-10-01

June 1996

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PMS

TECHNICAL MEMORANDUM

TO: Monte Symons - FHWA-LTPP
(2 copies)

FROM: William A. Phang

DATE: 8 July, 1996

REFERENCE: **CONSTRUCTION REPORT ON DE DOT SPS-1 PROJECT, US 113 SB, ELLENDALE, DE**
FILE: 50451211-13.19.1

The construction report for the SPS-1 Project, 100100, on US 113 SB, Ellendale, Delaware is forwarded enclosed.

The project is on the southbound driving lane of the new two-lane 'twinning' of US 113 at Ellendale, DE. Earthworks for this project were started in 1994, paving was started and completed in 1995 and opened to two-way traffic which utilized the two-lane roadway from November 1995 until July 01, 1996.

Post-construction testing of the test sections was not possible until rehabilitation of the northbound lanes was completed and re-opened to traffic. This testing is scheduled to begin shortly, although there may be scheduling complications as the Contractor is to apply a friction course. There is also some remedial work to be done on the passing lane. It is expected that a supplementary report to document this activity will be prepared.

Please advise me of questions arising, if any.

William A. Phang
Principal Investigator

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LTPP Specific Pavement Studies
Construction Report on SHRP 100100, SPS-1 Project
Ellendale, DE,
Spring 1994 - Fall 1995

Report No. FHWA-TS-96-10-01

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15. Supplementary Notes

The SPS Project 100100 is a part of the Specific Pavement Studies Experiment SPS-1, Strategic Study of Structural Factors for Flexible Pavements. It is located in the Wet-Freeze Environment Zone of the Federal Highway Administrations Long Term Pavement Performance Program and conforms to the L Series of Coarse Subgrades in the Experimental Design

16. Abstract

Project 100100 is located on the southbound driving lane of the 4-lane divided US-113, between Milford and Georgetown, Sussex Co., DE. There are twelve 500 ft long SPS-1 experimental sections and two supplemental agency test sections in the 4 45 mile construction contract The prime Contractor was Greggo and Ferrara of New Castle, DE. The Contractor was advised to proceed with the work on March 7, 1994. Bituminous Construction took place between June 9, 1995 and September 16, 1995 The southbound lanes were opened to traffic on December 4, 1995.

The report includes descriptions of the layout of the test sections, details of materials sampling and field and laboratory testing plans. Construction equipment used on the project is named and construction data and sequences are described. A SPS Project Deviation Report is included as Appendix A.

17. Key Words	18. Distribution Statement
LTPP, SPS-1, Dense Graded Aggregate Base (DGAB), Permeable Asphalt Treated Base (PATB), Coal Ash Stabilized Base (CASB)	

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FHWA-LTPP Project 100100
Federal Aid Project Number - NH-STP-S113 (1) 1996
DEL DOT CONTRACT NUMBER 88-013-02

INTRODUCTION

This SPS-1 project is located on Highway US 113 between Milford and Georgetown, Delaware, between State Routes S579 and S224 (Station 330+50 - 550+00) a distance of 4.45 miles. The closest town, Ellendale, is located on Route 16 which intersects US 113 at Station 487+00 (see Figure 1). The project is in the Wet-Freeze Environmental Zone of the Federal Highway Administration's Long Term Pavement Performance (FHWA-LTPP) Program and conforms to the L series of Coarse Subgrades in the experimental design.

US 113 was a two lane north-south arterial highway in the project area. The average annual daily traffic (two directions) is 10708 (1989), percent heavy trucks and combinations is 10%, the estimated 18 KESAL rate in the study lane (1000 ESAL/yr.) is 203.2 and the total design 18 KESAL applications in the design lane are 3,048,600 for a design period of fifteen years. The project involved the twinning of the existing two lanes with 2-24' lanes. The two new lanes will carry southbound traffic. The existing two lane facility will be widened and rehabilitated to form the two northbound lanes. Northbound and southbound traffic will be separated by a 26-42' wide median.

The Delaware DOT SPS-1 project involves the construction of twelve test sections and two supplemental test sections all of which are located on the southbound travel lane south of Route 16. There are no major road crossings within the test sections between Stations 330+50 and 430+50. The chainage runs opposite to the direction of traffic.

The SPS-1 project is located in the Atlantic Coastal Plain. The topography is flat to gently rolling. The soil is generally sand and silty sand. The water table is near the surface for long periods of time. The depth to bedrock is not known. It is believed to be several hundred feet below the surface.

The contract documents (plans, supplemental specifications, special provisions, bid proposals) were prepared by the Road Design Office at the Delaware DOT Head Office in Dover. Pavement Management Systems, the FHWA-LTPP Regional Contractor, provided information on the SPS-1 requirements to the Road Design Office, (Mr. L. Casanova, Mr. C. Carucci) in 1992 to assist with the preparation of the contract documents. Where existing specifications did not meet the SPS-1 requirements, special provisions were prepared and incorporated in the contract documents to comply with the Construction Guidelines for Experiment SPS-1, Strategic Study of Structural Factors for Flexible Pavements.

The bids for this DEL DOT contract No. 88-013-02 including the SPS-1 test sections closed on December 07, 1993. The contract was awarded to Greggo and Ferrara, Inc. on January 06, 1994 with a completion date of 540 calendar days. The total bid price was $6,568,523.20 which included a contingency for borrow materials. Since Delaware DOT provided the borrow source, a deduction will be made for this item. On March 07, 1994, the Contractor was advised to proceed with the work which was the first chargeable day. The 540 calendar days expired on August 28, 1995. On this date, a considerable amount of work was still required on the southbound lanes and the widening and the rehabilitation of the northbound lanes could not start until the southbound lanes were completed and two-way traffic was diverted to those lanes. Greggo and Ferrara were also the successful bidders on the adjoining SPS-2 project to the north which extended from State Route S224 to Milford, Delaware, a distance of 4.03 miles; Contract No. 88-013-04 Federal Aid Project No. NH-STP-S113 (2).

The Contractor's Team included Mr. Jim Austin, Superintendent (also Superintendent for the SPS-2 project); Mr. Larry Austin, Assistant Superintendent; Mr. Brent Fibelkorn, Grade Foreman; and Mr. Aran Fibelkorn, Assistant Foreman. Mr. Bruce Benson was the Asphalt Foreman.

The Subcontractors were Peltz Construction, Nebraska, for the soil cement and coal ash stabilized bases and Carney Contractors, Delaware, for the edge drains. Delaware DOT, through the efforts of Mr. Bob Radish arranged for the site; the electrical service and for the construction of the Automated Weather Station (AWS) compound with Chris Contractors, Delaware. The site is located on Department of Agriculture property at the southwest corner of State Route S623 and US 113 at Station 587+00. Pavement Management Systems Staff completed the instrumentation and the AWS became operable on November 15, 1995. This AWS will also serve the SPS-2 project.

The administration and supervision of the contract was carried out by the Delaware DOT Georgetown District Office - Mr. Allan Redden, District Engineer; Mr. David Mills, Construction Engineer and Mr. Thomas Brown, Construction Supervisor. Field Supervision was carried out by the Chief Project Inspector, Mr. Gerald Savage; Inspector , Mr. Mike Baily and additional Inspectors from the Consulting Firm of Site Engineers Inc.

The materials sampling, testing, and quality control support was provided from the Central Materials and Research Office in Dover through Field Technicians with Mobile Laboratories assigned or on loan to the District. The Materials and Research personnel involved with the project from the Dover office were Mr. Wayne Kling, Chief Materials and Research Engineer; Mr. Jim Pappas, Materials Engineer; Mr. William Brode, Portland Cement Concrete Supervisor; Mr. David Van Kavelarra, Soils Engineer; Mr. Al Strauss, Random Sampling Supervisor; Mr. Jim Reynolds, Project Field Coordinator; and Mr. Elmer Wooleyhand, Field Control Supervisor. Mr. Bob Radish, Field Technician, Materials and Research Division assigned to the Georgetown District Office and to the FHWA-LTPP project coordinated the field activities in support of the quality control work and the work required to obtain the data for the SPS-1 project. In addition to coordinating the work, Mr. Bob Radish made arrangements for the soil drilling crew, core drilling crew, sample containers, pavement marking and construction of the AWS. Mr. Garey Glanden was in charge of the core drilling crew and Mr. Wayne Hurd was in charge of the soil drilling crew.

The Contractor often did not leave much time for field testing before the next layer was to be placed (5 point levels, nuclear densities and moistures). Assistance was obtained from other Field Technicians (Mr. Al Strauss, Mr. Mike Johnson, Mr. Scott Shuh, Mr. Al Brittingham) on short notice so that there was never any delay to the Contractor's operations. Mr. Al Strauss also acted for Mr. Bob Radish in his absence, supervised the storage of the samples, provided the liaison between the field and the laboratory and obtained the bituminous asphalt plant reports. All of the samples were stored in a temporary metal container located at the Delaware DOT maintenance yard in Dover.

The on-site construction inspection of the SPS-1 project was carried out by Mr. Alex Rutka of Pavement Management Systems Limited (PMSL), the FHWA-LTPP North Atlantic Region Contractor. At various times he was assisted by Mr. Alfred Lip, Mr. Paul Woelfle, Mr. Dave Bauer and Mr. Ed Lesswing.

A WIM device was installed in the concrete pavement at the south end of the project at Station 329+00 on November 13, 1995. The installation was supervised by Mr. Bruce Littleton of the Delaware DOT Traffic Section. Seasonal monitoring instrumentation was installed in the transition area of test section 100102, at Station 403+35 by Pavement Management Systems staff in early October, 1995.

The SPS-1 pavement marking for monitoring purposes was completed on October 10, 1995. The bituminous surface course was placed on September 16 and 17, 1995 but due to shoulder work and to the construction at the intersection of US 113 and Route 16, the southbound lanes were not opened to traffic until Monday, December 04, 1995. The two northbound lanes were then closed to traffic and became available for widening and rehabilitation. The 1" Open Graded Friction Course will be placed in 1996. The test sections will have to be re-marked for monitoring purposes.

PROJECT DETAILS

Layout

The longitudinal layout showing the sequence of all of the test sections and the layer thicknesses is shown in Figure 2. Similar information is provided in Table 1.

On September 21, 1994 the Contractor requested a change in sequence of the test sections to help minimize the change in section depth between test sections and to facilitate continuous construction operations. On October 26, 1994, the Road Design Office advised the District that due to the complex nature of the change, it was not possible to estimate the cost benefits without a detailed design proposal and cost estimate from the Contractor. Approval of this proposal would require review of the location of Permeable Asphalt Treated Base (PATB) sections relative to the vertical alignment, review of median and side ditch grades for underdrain outlet placement, the addition/deletion of transverse interceptor trenches for the PATB layers and the effect on underdrain, excavation and embankment, borrow quantities etc. The Contractor did not follow up with any further study and the test section sequence remained as shown on the contract documents.

Materials Sampling and Testing

The final materials sampling and testing plans were issued by Pavement Management Systems on March 27, 1994. These plans show the following information which was required for materials sampling and testing purposes:

Figures 3 - 7	The Layout of the Field Materials Sampling and Testing Plan by Layers.
Figures 8 - 21	The Location of Field Sampling and Testing for Each Layer of Each Section.
Table 2	The Materials Codes used in the Sampling and Testing Plans.
Table 3	The Tests to be Performed on the Various Material Types by the Agency and FHWA.
Table 4	The Scope of Materials Sampling.
Table 4A	The Samples for the Materials Reference Library (MRL).
Table 5	The Scope of Field Testing.

The materials sampling and testing plans also include tracking tables for testing the various materials by the Delaware DOT State Laboratories and by the FHWA-LTPP Contractor Laboratory as follows:

Subgrade Materials	Tables 6, 6A
Embankment Materials	Tables 7, 7A
Unbound Granular Base	Tables 8, 8A
Permeable Asphalt Treated Base	Table 9
Asphalt Treated Base and Binder	Table 10
Asphalt Treated Base (BCBC)	Table 10A
Asphalt Concrete Surface and Binder	Tables 11, 11A

The majority of the samples were taken at locations shown on the sampling and testing plans. Any variance to the sample locations are explained in the appropriate section of the report.

All of the samples assigned to the Delaware DOT State Laboratory will be tested in the Delaware DOT Materials and Testing Laboratory #1021 located in Dover, Delaware. Mr. Jim Pappas is in charge of the Materials Laboratory and Mr. David Van Kavelaara, the Soils Laboratory. The samples for the FHWA-LTPP Contractor Laboratory will be tested by Law Engineering Inc., 396 Plasters Ave., Atlanta, Georgia 30324. The laboratory number is 1311 and the contact person is Mr. Richard Boudreau.

The 4" bituminous cores shown in Tables 10A and 11A were shipped to Law Engineering Inc. on October 27, 1995. They were bubble wrapped and placed in several cardboard boxes. The remaining samples including thin-walled tubes, subgrade materials, embankment materials and dense graded aggregate base materials, were shipped on April 10, 1996.

Samples taken for the Materials Reference Library (MRL), 1625 Crane Way, Sparks, Nevada, 89431 are shown in Table 12. These samples were accumulated during construction and stored in Georgetown and Dover. They were taken to TNT Red Star Shipping, Bridgeville, Delaware by Mr. Bob Radish on December 18 for delivery to MRL.

NOTES ON CONSTRUCTION OPERATIONS

Contract Documents

The contract documents show the longitudinal profile of the pavement structure, Figure 22. It is similar to Table 2. Figure 23 shows the pavement structure for sections 100101, 100102 and 100103; Figure 24 for 100104, 100105 and 100106; Figure 25 for sections 100107, 100108 and 100109; Figure 26 for sections 100110, 100111 and 100112; Figure 27 shows a typical southbound section drawing attention to the pavement structure of the two supplemental test sections DE-1 (100159) and DE-2 (100160).

All of the SHRP and supplemental test sections were constructed according to the contract drawings with one exception. The only deviation of the contract drawings and the SPS-1 Construction Guidelines was on the inside shoulder. The pavement structure of the test sections did not carry out through the shoulder and the edge drains were placed at the edge of the passing lane instead of a minimum of a 3' o/s. The 6" of DGAB on the shoulder was replaced with 3" of type 'A' borrow and 3" of deep strength asphalt. These conditions are not considered serious deviations since they will not affect the performance of the driving lane. The transverse underdrains shown in Figure 22 were not installed because the longitudinal grade was considered to be too flat.

The method of measurement and basis of payment was different for the Delaware DOT portion of this project compared to the SHRP portion. The Delaware DOT portions for DGAB and Hot Mix was paid by the sq. yds. and tons respectively. The SHRP portion was measured and paid as follows: DGAB sq. yds./6"; PATB sq. yds./4"; and Hot Mix sq. yds./in. The paid thicknesses were those shown on the contract documents.

Subgrade and Embankment

All of the SPS-1 test sections were located in a heavily wooded area which required cutting, clearing and grubbing. After the logs were removed, the tree stumps, roots, mats and topsoil were pushed on to a windrow on the median side and then removed by backhoe and trucks, Photo #1. Because of the wet weather during the spring and summer of 1994, earth grading and embankment construction on the SHRP sections did not start until September 1994 after a long period of dry whether. Bulk samples, nuclear densities and moisture tests were taken of the subgrade during the month of October 1994, Table 13. While the topography was generally flat, several test sections were located in partial cut and fill, (for example, Photo 2 shows section 100108, a shallow cut, with the B Horizon material being brought to the surface by the bulldozer). They are: 100104, 100106, 100109, 100108, 100101 and 100107. The contract documents show a 12" Type 'A' borrow in all of the test sections but if the subgrade in the cuts met Type 'A' borrow specifications it was left in place. The Type 'A' borrow specification is as follows:

> "The material shall have between 95 to 100% inclusive of dry weight passing a 3" (63mm) sieve and a maximum of 35% by dry weight passing the No. 200 (0.075mm) sieve".

Necessary borrow was obtained from the Eskridge pit which was acquired by Delaware DOT for contracts in the surrounding area. Borings were made in the Eskridge pit to indicate the type of borrow materials available and the soil stratigraphy. This boring information was provided in the contract documents. The borrow materials were brought in by trucks, then dumped, leveled and compacted in most cases with a DYNAPAC CA 251D single drum vibratory compactor. Compaction tests were taken during the construction of the embankments by Field Technicians for quality control purposes. To minimize any construction difficulties, the Contractor attempted to fill in the low areas first.

Good progress on embankment construction was made in the fall of 1994. Several test sections were constructed to box i.e., to the rough final earth grade with built up shoulder slopes. Any water trapped at the edge of the box, would be drained through a trench cut into the shoulder slope.

In April, 1995, the boxes of several of the test sections were rechecked and recompacted and left for fine grading and final grade approval until the next lift was to be placed. Very little time was available between the final grade approval and the placement of the next layer. Some of the test sections were soft and spongy and needed scarifying, aeration and time to dry, i.e., 100108, 100109 and 100159.

Thin walled (Shelby) tubes were obtained. FWD testing was done on the rough box grade of nine test sections. Five point levels and nuclear density and moisture tests were done after the earth grade was approved by the Chief Project Inspector. Proof rolling with a loaded dump truck was used for final earth grade approval. It should be noted that some thin walled tube samples within a test section were in cut and others in fill. Also the ends of some Shelby tubes were bent and stopped for no obvious reason. Shoulder probes were attempted at three locations with poor results due to the sandy nature of the soil and the high water table. The depth of penetration was approximately 13'.

Table 16 shows the sampling, field testing and construction dates for all of the activities on this project. It will be referred to several times throughout this report.

Dense Graded Aggregate Base (DGAB)

The gradation specification of DGAB is the same as for BCBC and is as follows:

Sieve	Weight Percentage Passing
1-1/2"	100
1"	95-100
3/4"	50-90
#4	20-50
#10	15-40
#30	15-40
#200	0-10

The aggregate came from the Arundel Quarry, Havre de Grace, Maryland. It is Igneous Diorite rock, (Traprock) and was placed in a stockpile in the Contractor's yard at Hudsons Pond from which it was taken as required. When the stockpile became depleted, the same aggregate was obtained from a stockpile in Seaford, Delaware.

The DGAB was placed on the embankment as soon as the grade was approved. Eight of the fourteen test sections required DGAB to depths of 4, 8 or 12". It was placed with a spreader box to a width of 12' (3 widths per layer) and in increments of 4". Each lift was compacted with an Ingersol Rand Pro Pac Series 100 single drum vibratory compactor. Compaction tests were taken for quality control purposes before the next lift was applied. The general practice was to cover the sandy soil with 4" of DGAB, leave it until it was to be compacted at which time a liberal amount of water would be added. The time interval could be short or several days. Bulk DGAB samples were taken as shown in Table 17.

Great difficulty was encountered in obtaining the grade meeting the tolerances of the specification with the size of aggregate. The method used at the beginning was the method used throughout all of the embankment grade construction and involved a grader and elevations marked on stakes with set o/s on the shoulders. Later for test sections 100107, 100108 and 100109 a laser grader was used along with a string line set on the median shoulder. This laser grader produced a good passing lane grade, but had difficulty carrying it to the driving lane. Several days were often required to obtain an adequate grade for some of the test sections. The time involved in the construction of the DGAB layers is shown in Table 16. Table 15 shows the density and the moisture content of the top DGAB layer.

Edge Drains

Four inch edge drains and 6" drain outlets were placed in the 6 PATB sections between July 20 and July 27, 1995. The fine grading of the earth and DGAB grade were not carried out until the edge drains were installed. Due to the flat longitudinal grade, the planned transverse underdrains between test sections were not installed. A transverse drain was installed at section 100111, Station 385+27 to carry the median edge drain to the outside shoulder outlet. The edge drain filter fabric came in a width of 90".

The location of the edge drain and outlet installations are shown in Table 18. Due to the shallow ditches in parts of the median or outside shoulders, it was not possible to space the outlets at 250' intervals as recommended in the SPS-1 Construction Guidelines.

Geotextile

Geotextile filter fabric was used for the edge drains and over the subgrade and DGAB where PATB was used. The filter fabric was placed over the subgrade in sections 100110, 100111 and 100112 and over the DGAB in sections 100107, 100108 and 100109. The filter fabric came in a 12' - 6" width.

In sections requiring a filter fabric for the full width of the subgrade, the first width was placed from the outside edge of the edge drain, as illustrated in Photo 3. The placement of a 10' PATB shoulder resulted in a 24" overhang. The placement of two additional 12' - 6" widths would not provide an adequate 24" overlap so a 6' wide strip of filter fabric was placed between the shuttle buggy and the asphalt paver for the paving of the driving lane. See Photo 4. The final 12' - 6" width was placed just prior to laying the PATB on the passing lane. Since the filter fabric basically covered the shoulder over the DGAB, one roll was adequate. No construction problems were encountered with the filter fabric, however, care had to be taken to avoid any turning of the rubber tracked asphalt paver so as not to bunch up the filter fabric.

The filter fabric used was Style 4552, which was obtained from:

Amoco Fabrics and Fibers Company
Hazelhurst Mills
P.O. Box 836
Hazelhurst, GA 31539-0451

The properties of Amoco Style 4552 Filter Fabric are shown in Table 19.

Coal Ash Stabilized Base (CASB)

The Subcontractor, Peltz Construction produced the coal ash stabilized base with their mobile plant stationed at the Eskridge pit. Six inches was placed over the subgrade on supplemental section 100160. The coal ash cement base consisted of 45% fly ash, 45% bottom ash and 10% cement. It has an optimum moisture content of 35% and a density of 70#/cu. ft. The fly ash stockpile is shown in Photo 5.

The construction equipment consisted of a Blaw Knox MC30 mobile conveyor, an ABG Titan 5111 paver and a combination pneumatic-steel vibratory 11 ton ABG GMAH roller. There were no laydown problems. The time from loading to compaction was set at 2 hours. This time was painted on the pavement behind the paver to ensure that the time limit was not exceeded; see Photo 6.

Asphalt Construction

The mix design designations, materials data (aggregates and material suppliers) and plant information is shown in Table 20. All of the hot mix was obtained from three Tilcon Asphalt Plants (6, 4 and 3) located in the Dover area, with an average haul distance of about 26 miles and haul times of about 1 hour. Table 21 shows a summary of the bituminous construction data of the driving lane. The asphalt paver was a BLAW Knox paver on normal paving and a rubber track mounted paver, Barber Greene BG225B 200 series, on PATB. A tack coat of CSS1H material was applied between all bituminous layers at the rate of 0.10 gals./sq. yd. Compaction for the normal bituminous pavement was obtained from 2 rollers:

1. Breakdown Roller
   Ingersol Rand DD90
   Double Drum Vibratory Roller

2. Final Roller
   Galion
   Steel-Wheel Tandem
   10.1 Ton

For PATB, only the Galion 10.1 ton steel wheel roller was used when the pavement reached a temperature of 150-170°F. Where a material type makes up more than 1 layer, densities and compaction were taken only on the top layer.

The shuttle buggy was used at all times. Haul trucks backed to the shuttle buggy from distances of up to 1/2 mile to avoid disturbing adjacent lanes. BCBC was placed on eight of the fourteen test sections to depths of 4, 6, 8 or 12". The specifications permitted the placement of 4" compacted lifts.

When the Project Inspectors found deficiencies in depths as measured with respect to final grade, a wedge or leveling course was placed. A wedge course of BCBC was placed on 6 of the 8 test sections shown in Tables 16 and 21. While compaction tests were taken by Field Technicians of every lift (not wedges), 5 point levels, density tests and compaction tests were taken only on the top of each material layer for SPS-1 construction. See Tables 16 and 21.

The specifications require 94% compaction of the first lift of BCBC and 96% on subsequent lifts. Ninety five percent compaction is required on all ACB and ACC lifts. The BCBC and ACB materials are obtained from the same stockpile and the only difference is the AC % and the number of Marshal Blows. BCBC requires 4.3% AC with 50 blows and ACB requires 3.9% AC with 75 blows.

Where required PATB is first placed on the outside shoulder and then on the driving lane. With the shuttle buggy and trucks using the passing lane, a lift of BCBC or ACB is placed on the driving lane. The shuttle buggy and the haul trucks then use the driving lane to place the PATB on the passing lane and the BCBC or ACB on the shoulder and passing lane. There was some delay in placement when the incoming haul trucks waited for the outgoing trucks to discharge their load since both used the same lane. The PATB was not exposed for any length of time and it is not used by the construction traffic.

All fourteen test sections required 1 or 2 lifts of ACB; six required 1 lift and eight required 2 lifts. A wedge lift was placed in two of the 1 lift sections and in three of the 2 lift sections. Densities were taken at the top of each ACB layer but no 5 point levels were taken. ACB is considered to be part of the surface course where 5 point levels, nuclear density, and compaction tests were taken, see Tables 15 and 16. Bulk bituminous and aggregate samples were taken during the course of construction. They are shown in Table 22.

An asphalt laboratory was operated in each asphalt plant by the Asphalt Plant Inspector. Test results were used for controlling the quality of the work. The plant reports were also sent to the Materials and Research Office and the test results were placed in the computer from which test data was obtained.

The information obtained is shown as follows:

Table 23	Bituminous Plant Reports BCBC
Table 24	Bituminous Plant Reports ACB
Table 25	Bituminous Plant Reports ACC and PATB

The BCBC, PATB and ACB results are generally within the specification limits. The ACC results were borderline. The % AC is on the high side and the % airvoids and % VMA are on the low side.

4" Cores

Four inch cores were taken as shown on the sampling and testing plan, Figure 7 on September 20, 1995. The design thickness of each materials layer and the actual thickness is shown in Table 26. Most of the cores, except as noted, were recovered intact. It was not possible to isolate the wedge layers within a materials type layer. However, during storage and in preparation for shipment of the cores to the FHWA-LTPP Contractor Laboratory on October 27, 1995, several cores lost their bond between the layers. It is not known what affect the wedge layers, if separated, will have on the overall strength of the pavement.

5 Point Levels

The dates that the 5 point levels were taken of the various layers and recorded on SPS-1 Construction Data Sheet 4 - Layer Descriptions are shown in Table 16. The 5 point level measurement compared with the design thickness for each layer are shown in Table 27. A comparison of all of the bituminous layers by the 4" cores and the 5 point levels is shown in Table 28. In general, the thickness obtained during construction of the layers was fairly close to the design thicknesses.

CONSTRUCTION OF TEST SECTIONS

The Contractor diligently carried out the construction which incorporated all of the requirements of the Construction Guidelines for SPS-1 Structural Factors for Flexible Pavement.

There was excellent cooperation and support for the SHRP project by the Contractor, by the District Construction staff, and by the Materials and Research staff who were responsible for the necessary liaison ensuring all of the SHRP requirements were met. A description of the following test sections, therefore, only highlights some of the major activities.

Test Section 100101 - Station 396+50 - Station 401+50

This test section is located in fill except from Station 397+50 - Station 398+00 where it is located in a shallow cut. The pavement structure consists of DGAB - 8"; ACB - 5.75"; and ACC - 1.25". Construction to a rough box grade was completed in April, 1995, but the final subbase grade was not approved until June 01, 1995. Proof rolling detected a soft spot on the outside shoulder between Station 400+35 and Station 400+70, from 6' to 10' from the edge of pavement. The soft spot was excavated to a depth of 18" and backfilled with Type 'A' borrow. A 4" lift of DGAB was placed and compacted on June 02, 1995 and the second 4" lift was placed on June 03, 1995. Before bulk sample B16 was taken , the driving lane was heavily watered so the sample was taken in the passing lane (see Table 17). Except for the shoulder probe, the sampling and field testing was carried out according to the sampling and field testing plan.

Tables 27 and 28 show that the total pavement thickness as indicated by the 5 point levels is 15" versus a design thickness of 15". For the bituminous layers only, the 4" cores and 5 point levels indicate a thickness of 7.16" and 6.84", respectively, versus a design thickness of 7". ACB and ACC compaction was 93.6% and 95.1%, respectively. See Tables 15 and 21. The specifications require 95%.

Test Section 100102 - Station 403+50 - Station 408+50

This test section is located in fill. The pavement structure consists of DGAB - 12"; ACB - 2.75"; and ACC - 1.25". The subbase was constructed to a rough box grade in April, 1995, but the final grade was not approved until May 31, 1995. Proof rolling revealed a soft spot in the outside shoulder between Station 406+50 and Station 406+60, from 4' to 10' from the edge of pavement. The soft spot was excavated to a depth of 3' and backfilled with Type 'A' borrow.

Thin walled samples were obtained from boreholes A4, A5, and A6. The recovery was generally good. In borehole A6, a thin piece of a dense clay ball was encountered at 17" causing the portion of the sample between 17-24" to be lost. The remainder of the borehole was recovered.

The first 4" lift of DGAB was placed on May 31, 1995. The second and third 4" lifts were placed on June 03 and June 08, 1995. Before bulk sample B15 was taken, the driving lane was heavily watered so the sample was taken in the passing lane (see Table 17). Except for shoulder probe S4 the sampling and field testing followed the sampling and field testing plan. Since the outside shoulder was not accessible, the shoulder probe was taken on the median shoulder at Station 407+75. The auger could only reach 18' because of the sandy nature of the soil and the high water table. In any case, the depth to bedrock in this area is unknown.

Tables 27 and 28 show that the total pavement thickness as indicated by the 5 point levels is 15.9" versus a design thickness of 16". For the bituminous layers only, the 4" cores and 5 point levels indicate a thickness of 3.94" and 4.08", respectively, versus a design thickness of 4". ACB and ACC compaction was 97.3% and 96.7%, respectively. See Tables 15 and 21. The specifications require 95%.

Test Section 100103 - Station 386+50 - 391+50

This test section is located in fill. The pavement structure consists of BCBC - 8"; ACB - 2.75"; and ACC 1.25". The subbase was constructed to a rough box grade in April, 1995. Shoulder probe S6 placed on the inside shoulder was drilled to 13' due to sandy nature of the soil and the high water table. The subbase grade was approved on June 06, 1995. On June 09, 1995, the first 4" lift of BCBC (actually ACB) was placed. During the operation, the subbase was somewhat dry and it was rutting under the wheels of the asphalt spreader. The paving was stopped while the grade was watered, leveled and recompacted. The delay in laydown time (approximately 2-1/2 hrs.) is indicated in Table 21. The second 4" lift of BCBC was placed on June 15, 1995. A wedge lift of ACB (actually BCBC) was placed on July 14, 1995.

Tables 27 and 28 show that the total pavement thickness as indicated by the 5 point levels is 12.84" versus a design thickness of 12". For the bituminous layers only, the 4" cores and 5 point levels indicate a thickness of 12.34" and 12.84", respectively, versus a design thickness of 12". Actual compaction results were - BCBC - 97.8%; ACB - 95.6%; and ACC - 95.5%. See Tables 15 and 21. The specifications require 94% for BCBC (1st lift); 96% remaining BCBC/lifts; and 95% for ACC and ACB.

Test Section 100104 - Station 331+25 - Station 336+25

This section is located in cut except from Station 332+50 - Station 334+50 which is a fill section. The pavement structure consists of BCBC - 12"; ACB - 5.75"; and ACC - 1.25". The subgrade was constructed to a rough box grade on June 19, 1995. Shelby tube samples were taken on May 09, 1995. Boreholes A19 and A20 were located in cut while A21 was located in fill. No shoulder probe was obtained. The cut subgrade material met the Type 'A' borrow requirements. The first 4" of BCBC was placed on June 20, 1995. A wedge lift was placed in the BCBC layers.

Tables 27 and 28 show that the total pavement thickness as indicated by the 5 point levels is 18.7" versus a design thickness of 19". For the bituminous layers only, the 4" cores and 5 point levels indicate a thickness of 18.46" and 18.7", respectively, versus a design thickness of 19". Actual compaction results were - BCBC - 98.7%; ACB - 95.8% and ACC - 96.2%. See Tables 15 and 21. The specifications require 94% for BCBC (1st lift); 96% remaining BCBC lifts; and 95% for ACC and ACB.

Test Section 100105 - Station 410+50 - Station 415+50

This section is located in fill. The pavement structure consists of DGAB - 4"; BCBC - 4; ACB - 2.75" and ACC - 1.25". The subbase was constructed to a rough box grade in April, 1995. There was no shoulder probe. The final grade was completed on May 23, 1995, at which time it was discovered that the grade stakes were incorrect. The section was regraded and the grade was approved on May 25, 1995. Heavy rain prevented the placement of DGAB until May 30, 1995. A wedge lift of ACB was placed on September 14, 1995 in both the driving and passing lanes.

Tables 27 and 28 show that the total pavement thickness as indicated by the 5 point levels is 12.1" versus a design thickness of 12". For the bituminous layers only, the 4" cores and 5 point levels indicate a thickness of 7.89" and 8.79", respectively, versus a design thickness of 8". Actual compaction results were - BCBC - 99.3%; ACB - 98.0% and ACC - 96.6%. See Tables 15 and 21. The specifications require 94% for BCBC (1st lift); 96% for remaining BCBC lifts and 95% for ACC and ACB.

Test Section 100106 - Station 337+50 - Station 342+50

This section is located in cut from Station 337+50 - Station 340+00 and in fill from Station 340+50 - Station 342+50. The pavement structure consists of DGAB - 4"; BCBC - 8"; ACB - 5.75" and ACC - 1.25". The cut subgrade met the Type 'A' borrow requirements. Shoulder probe S13 was taken in the median shoulder to a depth of 13' at Station 337+65. Final subgrade was approved on June 21, 1995. The DGAB layer was placed on June 22, 1995 and the first BCBC lift was placed on July 14, 1995. A BCBC wedge lift was placed between the two BCBC lifts on July 19, 1995.

Table 27 and 28 show that the total pavement thickness as indicated by the 5 point levels is 19.1" versus a design thickness of 19". For the bituminous layers only, the 4" cores and 5 point levels indicate a thickness of 15.4" and 14.36", respectively, versus a design thickness of 15". Actual compaction results were - BCBC - 100%; ACB - 93.1% and ACC - 95.5%. The specifications require 94% for BCBC (1st lift); 96% for remaining BCBC lifts and 95% for ACC and ACB.

Test Section 100107 - Station 417+50 - Station 422+50

This section is located in fill from Station 417+50 - Station 419+00 and in shallow cut from Station 419+00 - Station 422+50. The pavement structure consists of DGAB - 4"; PATB - 4"; ACB - 2.75" and ACC - 1.25". Construction of the subgrade to a rough box grade was completed in April, 1995. Shelby tube boreholes A1 and A2 were in cut while A3 was in fill. The final subgrade was approved on June 30, 1995 and the DGAB was placed on July 01, 1995. Edge drains were placed on July 27, 1995. Because of the difficulties in obtaining the final DGAB grade with a conventional grader, a laser guided grader that worked from a stringline was utilized. The grade on the passing lane was readily obtained but carrying the grade on to the driving lane was difficult. Three days were required to get an approved DGAB grade. The grade was approved on August 17, 1995. There were no difficulties with the placement of the geotextile fabric. A wedge lift of ACB was placed on September 14, 1995 just prior to the ACC lift which was placed on September 16, 1995.

Tables 27 and 28 show that the total pavement thickness as indicated by the 5 point levels is 12.5" versus a design thickness of 12". For the bituminous layers only, the 4" cores and 5 point levels indicate a thickness of 8.92" and 8.50", respectively, versus a design thickness of 8". Actual compaction results were - ACB - 98.1% and ACC - 95.1%. See Tables 15 and 21. The specifications require 95%.

Test Section 100108 - Station 358+50 - Station 363+50

This section is located in cut from Station 358+50 - Station 361+00 and in fill from Station 361+00 - Station 363+50. The pavement structure consists of DGAB- 8"; PATB - 4"; ACB - 5" and ACC - 1.25". The cut subgrade was excavated to a depth of 20-30" and backfilled with Type 'A' borrow. The subgrade was soft and spongy from Station 358+50 - Station 360+50 and it was aerated through shallow scarification. It was difficult to stabilize the section from Station 361+00 - Station 364+50 so deep scarification with an angled bulldozer blade was utilized. The subbase was constructed to a rough base on June 05, 1995. Shelby tubes were obtained on June 05, 1995. The final subbase grade was approved on June 20, 1995.

Bulk embankment sample B12 was missed. In anticipation of heavy rain 4" of DGAB was placed and compacted on June 21, 1995. The second 4" DGAB lift was placed on July 11, 1995. No further work took place until the edge drains were installed on July 25, 1995. An error was found on the grade stakes which required the section to be regraded. It took three days to obtain an approved grade because of the difficulty in getting the tolerance required mainly because of aggregate gradation. The were no problems with either the PATB or the geotextile fabric. An ACB wedge was placed between the two ACB lifts.

Tables 27 and 28 show that the total pavement thickness as indicated by the 5 point levels is 18" versus a design thickness of 19". For the bituminous layers only, the 4" cores and 5 point levels indicate a thickness of 10.89" and 10.73", respectively, versus a design thickness of 11". Actual compaction results were - ACB - 93.1% and ACC - 95.9%. See Tables 15 and 21. The specifications require 95%.

Test Section 100109 - Station 351+50 - Station 356+50

This section is located in cut from Station 351+50 - Station 355+00 and in fill from Station 355+00 - Station 356+50. The subgrade material meets the Type 'A' borrow specification. The pavement structure consists of DGAB - 12"; PATB - 4"; ACB - 5.75" and ACC - 1.25". The subgrade was approved on June 20, 1995 and a 4" lift of DGAB was placed on June 21, 1995. The second and third lifts of DGAB were completed on July 05, 1995 and July 11, 1995, respectively. The edge drains were installed on July 23, 1995. Fine grading of the DGAB began on August 08, 1995 and was finally approved on August 17, 1995. A laser grader was resorted to during the grading process. The compaction effort seemed severe resulting in fines being brought to the surface. In trying to obtain an adequate grade with the appropriate tolerance the DGAB surface was scarified, reshaped and recompacted several times. An ACB wedge was placed between the ACB lifts.

Tables 27 and 28 show that the total pavement thickness as indicated by the 5 point levels is 23.6" versus a design thickness of 23". For the bituminous layers only, the 4" cores and 5 point levels indicate a thickness of 11.28" and 11.48", respectively, versus a design thickness of 11". Actual compaction results were - ACB - 94.4% and ACC - 96.0%. See Tables 15 and 21. The specifications require 95%.

Test Section 100110 - Station 365+50 - Station 370+50

This section is located in fill. The pavement structure consists of PATB - 4"; BCBC - 4"; ACB - 5.75" and ACC - 1.25". The surface was soft and spongy. Deep aeration, to a depth of 2', was done with an angled bulldozer blade between Station 361+00 - Station 367+75. See Photo 2. The softest portion of this area was between Station 366+00 - Station 367+25. The box grade was approved on June 29, 1995. The edge drains were installed on July 25, 1995 and the subbase grade was approved on August 04, 1995. The haul trucks backed in to the shuttle buggy over the passing lane for the placement of the PATB on the shoulder and driving lane and the BCBC on the driving lane. The passing lane became badly rutted. It had to be leveled and recompacted before the PATB was placed. There were no problems with geotextile placement. The 4" lift of BCBC was 1-2" low, so a wedge lift of BCBC was placed.

Tables 27 and 28 show that the total pavement thickness obtained by the 5 point levels was 15.0" versus a design thickness of 15". For the bituminous layers only, the 4" cores and 5 point levels indicate a thickness of 15.04" and 15.0", respectively, versus a design thickness of 15". Actual compaction results were - BCBC - 104.0%; ACB - 92.7% and ACC - 95.4%. See Tables 15 and 21. The specifications require 94% for BCBC (1st lift); 96% for remaining BCBC lifts and 95% for ACC and ACB.

Test Section 10111 - Station 379+50 - Station 384+50

This section is located in fill. The pavement structure consists of PATB - 4"; BCBC - 8"; ACB - 2.75" and ACC - 1.25". Edge drains were placed on July 26, 1995 and the subbase grade was approved on August 04, 1995. The PATB placement started on August 09, 1995 on the shoulder at Station 385+50 and proceeded in a southerly direction. There was a minor problem getting the paver started relative to PATB slope and thickness causing the machine to turn and to bunch up the geotextile. This was readily corrected and no problems resulted thereafter. Trucks entered and exited on the passing lane in placing the PATB and BCBC on the driving lane resulting in a load to unload time of two hours (see Table 21).

All the joints in the transition areas were sawn vertically at the locations shown on the plans. A wedge lift was placed in the BCBC layer and in the ACB layer.

Tables 27 and 28 show that the total pavement thickness obtained by the 5 point levels was 16.2" versus a design thickness of 16". The 4" cores indicated a thickness of 16.81". Actual compaction results were - BCBC - 101.3%; ACB - 94.7% and ACC - 96.8%. See Tables 15 and 21. See section 100110 for the specification requirements.

Test Section 100112 - Station 372+50 - Station 377+50

This section is located in fill. The pavement structure consists of PATB - 4"; BCBC - 12"; ACB - 2.75" and ACC - 1.25". The box grade was completed in April, 1995 but the final grade was not approved until August 04, 1995. Edge drains were installed on July 26, 1995. There was good recovery of the Shelby tubes. This section was paved at the same time as section 100111. A BCBC wedge lift was placed between the first and second BCBC lifts and an ACB wedge lift (actually BCBC) was placed on top of the ACB layer. The 4" cores did not recover any of the PATB layer.

Tables 27 and 28 show that the total pavement thickness obtained by the 5 point levels was 20.2" versus a design thickness of 20". For the bituminous layers only, (without the PATB), the 4" cores and 5 point levels indicate a thickness of 16.72" and 16.80", respectively, versus a design thickness of 16". Actual compaction results were - BCBC - 102.3%; ACB - 95.1% and ACC 96.6". See Tables 15 and 21. See section 100110 for the specification requirements.

Supplemental Section 100159 - Station 344+50 - Station 349+50

The pavement structure for this section consists of - DGAB - 8"; BCBC - 6"; ACB - 4.75" and ACC - 1.25". This section is different in that the pavement layers do not extend through the outer and inner shoulders. The box grade was completed in May 1995 and the final subbase grade was approved on June 21, 1995. Recovery from the Shelby tube at borehole A17 was limited to 20" because the tip of the tube was bent. Recovery from the Shelby tube at borehole A18 was limited to 24" because dry sand was encountered. The 6" of DGAB on the shoulders was replaced with 3" of Type 'A' borrow and 3" of deep lift asphalt. A BCBC wedge lift was placed between the lifts of BCBC. A sand joint was placed on the 1st lift of the ACB at Station 349+07. It was the only joint placed within any of the test sections. Normally the Contractor would finish the lift even if a long period of waiting was required.

Tables 27 and 28 show that the total pavement thickness obtained by the 5 point levels was 19.8" versus a design thickness of 20". For the bituminous layers only, the 4" cores and 5 point levels indicate a thickness of 12.53" and 12.12", respectively, versus a design thickness of 12". Actual compaction results were - BCBC - 99.1%; ACB - 94.2% and ACC 95.4%. See Tables 15 and 21. Specification requirements are noted in section 100110.

Supplemental Section 100160 - Station 424+50 - Station 429+50

This section is located in fill. The pavement structure consists of CASB - 6"; BCBC - 6"; ACB - 4.75" and ACC - 1.25". The CASB mixing plant was located at the Eskridge Pit and the laydown equipment was the same as that used for the soil cement utilized outside of the SHRP portion of the project. There were no placement problems with the CASB. The FWD results showed high deflections and hence the drop load was reduced. The first two lifts of BCBC placed on June 08-09, 1995, were actually ACB and the 1st lift of ACB placed on June 15, 1995 was BCBC. This is according to the asphalt plant reports. BCBC and ACB were made at the same plant and from the same stockpiles. The only difference is the AC percentage. BCBC requires 4.3% AC with fifty blows and ACB requires 3.9% AC with seventy five blows.

Tables 27 and 28 show that the total pavement thickness obtained by the 5 point levels was 18.3" versus a design thickness of 18". For the bituminous layers only the 4" cores and 5 point levels indicate a thickness of 13.06" and 12.84", respectively, versus a design thickness of 12". Actual compaction results were - BCBC - 98.7%; ACB - 95.8%; and ACC - 96.2%. See Tables 15 and 21. Specification requirements are noted in Section 100110.

TRAFFIC

The two southbound lanes were opened to two way traffic on December 04, 1995. The two northbound lanes will be closed to traffic until they have been widened and rehabilitated. The 1" Open Graded Friction course is missing and will be placed in 1996.

CONCLUSION

The requirements of the contract documents were meticulously followed. The Contractor seemed to schedule the work in such a way so as to minimize any disturbance of other test sections. There was a large time gap between the construction of the box grade and the final approved grade. The section requiring geotextile were left to the end until the edge drains were placed. A review of the construction activity dates show this type of information.

At times, the Contractor did not have sufficient haul trucks especially for borrow and for the DGAB because they were not available or because they were assigned to the SPS-2 project. The quality of the work was of a very high order and probably much better and much more time consuming than would be obtained for a normal construction project.

Note:

Pavement Performance

On December 4, 1995, the northbound traffic was shifted to the southbound lanes to permit the closing of the northbound lanes for rehabilitation purposes.

The performance of the pavement in all of the test section is good except for the passing lane in test section 100102 Stations 403+50 - 408+50. The pavement structure in this section consisted of 4" bituminous surface course, 12" DGAB and 12" of select type 'A' borrow.

On February 26, 1996, rutting and alligatoring was noted in the outside wheel path of the northbound traffic lane for a length of about 50' in the vicinity of Station 406+75. This lane will become the southbound passing lane when all four lanes are open to traffic.

Additional rutting and alligatoring developed in the outside wheel path but it is not continuous. The condition of the rutting and alligatoring of this section on May 2, 1996 is as follows:

1. 403+10 - 403+90 slight to medium rutting, some alligatoring. The seasonal instrumentation probe is located at 403+35. See Photo 7.
2. 405+00 - 405+55 slight to medium rutting and alligatoring.
3. 406+35 - 406+90 medium to heavy rutting with a patch in the wheel path 406+60 - 406+90. See Photo 8.

FWD testing will be carried out to determine the cause of the failure when the northbound lanes are re-opened to traffic. DEL DOT have obtained bituminous cores of the failed areas and have found that the materials met their specification requirements.

A supplement to this report will be issued to document post-construction testing and any repair work Delaware DOT may require because of the premature cracking of the passing lane adjacent to test section 100102.

TABLE 1
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Layout and Structure of Test Sections

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CONST. STA.	LENGTH FT	SECTION I.D.	EMBANK-MENT	SUBBASE TYPE	SUBBASE THICK	BASE TYPE	BASE THICK	SURFACE TYPE	SURFACE THICK	REMARKS	MONITOR STA.
430+50 30+00	100'		Type A Borrow							Begin SPS-1	
29+50 424+50	500'	100160	12"	CASB	6"	BCBC	6"	OG ACC ACB ACB	1" 1.25" 2.75" 2"	T=18"	0+00 5+00
423+50	200'										
22+50 417+50	500'	100107	12"	GABC/ DGAB	4"	PATB	4"	OG ACC ACB	1" 1 25" 2.75"	T=13" Edge Drain	0+00 5+00
416+50	200'									Transverse Drain	
415+50 410+50	500'	100105 ✓	12"	GABC/ DGAB	4"	BCBC	4"	OG ACC ACB	1" 1 25" 2.75"	T=13"	0+00 5+00
409+50	200'										
408+50 403+50	500'	100102	12"	---	---	GABC	12"	OG ACC ACB	1" 1 25" 2.75"	T=17"	0+00 5+00
402+50	200'										
401+50 396+50	500'	100101 ✓	12"	GABC/ DGAB	8"	ACB	3"	OG ACC ACB	1" 1 25" 2.75"	T=16"	0+00 5+00
395+75	500'										
391+50 386+50	500'	100103 ✓	12"	---	---	BCBC	8"	OG ACC ACB	1" 1.25" 2.75"	T=13"	0+00 5+00
385+50	200'									Transverse Drain	
384+50 379+50	500'	100111	12"	PATG Geotextile	4"	BCBC	8"	OG ACC ACB	1" 1.25" 2.75"	T=17" Edge Drains	0+00 5+00
378+50	200'									Transverse Drains	

NOTE. T= Total Pavement Thickness (does not include embankment fill)

TABLE 1 (Cont.)
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Layout and Structure of Test Sections

CONST. STA.	LENGTH FT	SECTION I.D.	EMBANK-MENT	SUBBASE		BASE		SURFACE		REMARKS	MONITOR STA.
				TYPE	THICK	TYPE	THICK	TYPE	THICK		
377+50			Type A					OG	1"	T=21"	0+00
	500'	100112	Borrow	PATB	4"	BCBC	12"	ACC	1.25"	Edge	
372+50			12"	Geotextile				ACB	2.75"	Drains	5+00
371+50	200'										
370+50								OG	1"	T=16"	0+00
	500'	100110	12"	PATB	4"	BCBC	4"	ACC	1 25"	Edge	
				Geotextile				ACB	2.75"	Drains	
365+50								ACB	3"		5+00
364+50	200'									Transverse Drain	
363+50				Prime				OG	1"	T=20"	0+00
	500'	100108	12"	GABC/	8"	PATB	4"	ACC	1 25"	Edge	
				DGAB				ACB	2.75"	Drains	
358+50								ACB	3"		5+00
357+60	200'									Transverse Drains	
356+60				Prime				OG	1"	T=24"	0+00
	500'	100109	12"	GABC/	12"	PATB	4"	ACC	1 25"	Edge	
				DGAB				ACB	2.75"	Drains	
351+50								ACB	3"		5+00
350+50	200'										
349+50								OG	1"	T=21"	0+00
	500'	100159	12"	GABC/	8"	BCBC	6"	ACC	1.25"		
				DGAB				ACB	2.75"		
344+50								ACB	2"		5+00
343+50	200'										
342+50								OG	1"	T=20"	0+00
	500'	100106	12"	GABC/	4"	BCBC	8"	ACC	1.25"		
				DGAB				ACB	2.75"		
337+50								ACB	3"		5+00
336+87	125'										
336+25								OG	1"	T=20"	0+00
	500'	100104	12"	---	---	BCBC	12"	ACC	1.25"		
								ACB	2.75"		
331+25								ACB	3"		5+00
330+50	75'									End SPS-1	

TABLE 2
DE DOT SPS-1, US 113 SB, ELLENDALE, DE
Project Material Codes

MATERIAL CODE	MATERIAL TYPE	MATERIAL DESCRIPTION
A	SS	Natural Subgrade Soil
B	EMB	Embankment Fill (approximately 0.3m)
C	GABC/DGAB	Dense Graded Aggregate Base Course, Type B
D	CASB	Coal Ash Stabilized Soil Base Course
E	PATB	Permeable Asphalt Treated Base
F	BCBC	Bituminous Base Course
G	AC-B	Hot Mix Binder Course
H	AC-C	Hot Mix Surface Course
J	OG	Open Graded Friction Course

TABLE 3
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Samples to be Used for Laboratory Materials Testing

sheet 1/4

Materials Type and Properties	LTPP Designation	LTPP Protocol	Minimum No. of Tests per Layer	Sampling Location	Sample Type	Test Conduced by: Agency	Test Conduced by: FHWA
SUBGRADE							
Sieve Analysis	SS01	P51	7	B1-B7	181 kg Bulk		Yes
Hydrometer to 0 001 mm	SS02	P42	7	B1-B7			Yes
Atterberg Limits	SS03	P43	7	B1-B7			Yes
Classification	SS04	P52	7	B1-B7			Yes
(visual-manual only on thin-wall tubes)			21	A1-A21	Shelby tube	Yes	Yes
Moisture-Density Relations	SS05	P55	7	B1-B7	181 kg Bulk		Yes
Resilient Modulus	SS07	P46	7	A2, A5, A9, A11, A14, A17, A19	Shelby tube		Yes
(if thin-wall tube is not available)			7	B1-B7	181 kg Bulk		Yes
Unit Weight (if thin-wall tube is not available, test is not conducted)	SS08	P56	7	A1, A4, A8, A10, A13, A16, A19	Shelby tube	Yes	
Natural Moisture Content	SS09	P49	7	B1-B7	181 kg Bulk		Yes
Unconfined Comp. Strength (if thin-wall tube is not available, test is not conducted)	SS10	P54	7	A1, A4, A8, A10, A13, A16, A19	Shelby tube	Yes	
Permeability	SS11	P57	3	A3, A7, A18	Shelby tube	Yes	
Permeability (if thin-wall tube is not available)	UG09	P48	7	B1-B7	181 kg Bulk	Yes	
EMBANKMENT < 1.2m (4 ft.) Thick							
Sieve Analysis	SS01	P51	7	B8-B14	181 kg Bulk		Yes
Hydrometer to 0.001 mm	SS02	P42	7	B8-B14	181 kg Bulk		Yes
Atterberg Limits	SS03	P43	7	B8-B14	181 kg Bulk		Yes
Classification	SS04	P52	7	B8-B14	181 kg Bulk		Yes
Moisture-Density Relations	SS05	P55	7	B8-B14	181 kg Bulk		Yes
Resilient Modulus	SS07	P46	7	B8-B14	181 kg Bulk		Yes
Natural Moisture Content	SS09	P49	7	B8-B14	181 kg Bulk		Yes
Permeability	UG09	P48	7	B8-B14	181 kg Bulk	Yes	

TABLE 3 (Cont.)
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Samples to be Used for Laboratory Materials Testing

sheet 2/4

Materials Type and Properties	LTPP Designation	LTPP Protocol	Minimum No. of Tests per Layer	Sampling Location	Sample Type	Test Conduced by: Agency	Test Conduced by: FHWA
UNBOUND GRANULAR BASE							
Particle Size Analysis	UG01	P41	3	B15-B17	181 kg Bulk		Yes
Sieve Analysis (washed)	UG02	P41	3	B15-B17	181 kg Bulk		Yes
Atterberg Limits	UG04	P43	3	B15-B17	181 kg Bulk		Yes
Moisture-Density Relations	UG05	P44	3	B15-B17	181 kg Bulk		Yes
Resilient Modulus	UG07	P46	3	B15-B17	181 kg Bulk		Yes
Classification	UG08	P47	3	B15-B17	181 kg Bulk		Yes
Permeability	UG09	P48	3	B15-B17	181 kg Bulk	Yes	
Natural Moisture Content	UG10	P49	3	B15-B17	181 kg Bulk		Yes
PERMEABLE TREATED ASPHALT BASE							
Asphalt Content (Extraction)	AC04	P04	3	B18-B20 from paver	45 kg Bulk	Yes	
Extracted Aggregate:							
Gradation of Aggregate	AG04	P14	3	B18-B20 from paver	45 kg Bulk	Yes	

TABLE 3 (Cont.)
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Samples to be Used for Laboratory Materials Testing

sheet 3/4

Materials Type and Properties	LTPP Designation	LTPP Protocol	Minimum No. of Tests per Layer	Sampling Location	Sample Type	Test Conduced by: Agency	Test Conduced by: FHWA
ASPHALT TREATED BASE							
Core Examination/Thickness	AC01	P01	36	C1-C4, C27-C44, C55-C68	4" O.D. Cores	Yes	Yes
Bulk Specific Gravity	AC02	P02	36	C1-C4, C27-C44, C55-C68	4" O.D. Cores	Yes	Yes
Maximum Specific Gravity	AC03	P03	3	BT20-BT22 from paver	91 kg Paver	Yes	
Asphalt Cement (Extraction)	AC04	P04	3	BT20-BT22 from paver	91 kg Paver	Yes	
Moisture Susceptibility	AC05	P05	3	BT20-BT22 from paver	91 kg Paver	Yes	
Resilient Modulus	AC07	P07	9	C27-C29, C35-C37, C59-C61	4" O.D. Cores		Yes
Tensile Strength	AC07	P07	12	C27-C30, C35-C38, C59-C62	4" O.D. Cores		Yes
EXTRACTED AGGREGATE:							
Specific Gravity:							
Coarse Aggregate	AG01	P11	3	BT20-BT22 from paver	91 kg Paver	Yes	
Fine Aggregate	AG02	P12	3	BT20-BT22 from paver	91 kg Paver	Yes	
Gradation of Aggregate	AG04	P14	3	BT20-BT22 from paver	91 kg Paver	Yes	
NAA Test for Fine Aggregate	AG05	P14A	3	BT20-BT22 from paver	91 kg Paver	Yes	
Particle Shape							
ASPHALT CEMENT:							
Absorn Recovery	AE01	P21	3	BT20-BT22 from paver	91 kg Paver	Yes	
Penetration at 25C, 46C (77F, 115F)	AE02	P22	3	BT20-BT22 from paver	91 kg Paver	Yes	
Specific Gravity 16C (60)	AE03	P23	3	BT20-BT22 from paver	91 kg Paver	Yes	
Viscosity at 25C (77F)	AE04	P24	3	BT20-BT22 from paver	91 kg Paver	Yes	
Viscosity at 60C, 135C, (140F, 275F)	AE05	P25	3	BT20-BT22 from paver	91 kg Paver	Yes	
ASPHALT CEMENT: (From Tanker or Plant)							
Penetration at 25C, 46C (77F, 115F)	AE02	P22	3	B21-B23 from plant	19L Tanker	Yes	
Specific Gravity 16C (60F)	AE03	P23	3	B21-B23 from plant	19L Tanker	Yes	
Viscosity at 25C (77F)	AE04	P24	3	B21-B23 from plant	19L Tanker	Yes	
Viscosity at 60C, 135C (140F, 275F)	AE05	P25	3	B21-B23 from plant	19L Tanker	Yes	

TABLE 3 (Cont.)
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Samples to be Used for Laboratory Materials Testing

sheet 4/4

Materials Type and Properties	LTPP Designation	LTPP Protocol	Minimum No. of Tests per Layer	Sampling Location	Sample Type	Test Conduced by: Agency	Test Conduced by: FHWA
ASPHALTIC CONCRETE SURFACE AND BINDER							
Core Examination/Thickness	AC01	P01	68	C1-C68	4" O.D. Cores	Yes	Yes
Bulk Specific Gravity	AC02	P02	68	C1-C68	4" O.D. Cores	Yes	Yes
Maximum Specific Gravity	AC03	P03	3	BA20-BA29 from paver	91 kg Paver	Yes	
Asphalt Content (Extraction)	AC04	P04	3	BA20-BA29 from paver	91 kg Paver	Yes	
Moisture Susceptibility	AC05	P05	3	BA20-BA29 from paver	91 kg Paver	Yes	
Creep Compliance	AC06	P06	4	C9, C25, C49, C63	4" O.D. Cores		Yes
Resilient Modulus	AC07	P07	18	C5-C7, C11-C13, C21-C23	4" O.D. Cores		Yes
				C35-C37, C45-C47, C59-C61	4" O.D. Cores		
Tensile Strength	AC07	P07	24	C5-C8, C11-C14, C21-C24	4" O.D. Cores		Yes
				C35-C38, C45-C48, C59-C62	4" O.D. Cores		
Extracted Aggregate:							
Specific Gravity:							
Coarse Aggregate	AG01	P11	3	BA20-BA29 from paver	91 kg Paver	Yes	
Fine Aggregate	AG02	P12	3	BA20-BA29 from paver	91 kg Paver	Yes	
Gradation of Aggregate	AG04	P14	3	BA20-BA29 from paver	91 kg Paver	Yes	
NAA Test for Fine Aggregate	AG05	P14A	3	BA20-BA29 from paver	91 kg Paver	Yes	
Particle Shape							
Asphalt Cement:							
Abson Recovery	AE01	P21	3	BA20-BA29 from paver	91 kg Paver	Yes	
Penetration at 25C, 46C (77F, 115F)	AE02	P22	3	BA20-BA29 from paver	91 kg Paver	Yes	
Specific Gravity 16C (60F)	AE03	P23	3	BA20-BA29 from paver	91 kg Paver	Yes	
Viscosity at 25C (77F)	AE04	P24	3	BA20-BA29 from paver	91 kg Paver	Yes	
Viscosity at 60C, 135C (140F, 275F)	AE05	P25	3	BA20-BA29 from paver	91 kg Paver	Yes	
Asphalt Cement: (From Tanker)							
Penetration at 25C, 46C (77F, 115F)	AE02	P22	3	B24-B26 from plant	19L Tanker	Yes	
Specific Gravity 16C (60F)	AE03	P23	3	B24-B26 from plant	19L Tanker	Yes	
Viscosity at 25C (77F)	AE04	P24	3	B24-B26 from plant	19L Tanker	Yes	
Viscosity at 60C, 135C (140F, 275F)	AE05	P25	3	B24-B26 from plant	19L Tanker	Yes	

TABLE 4
DE DOT SPS-1 PROJECT 100100, US 113 SB, ELLENDALE, DE
Scope of Material Sampling

Material and Sample Description	Number of Samples	Sample Locations
Asphalt Coring		
Coring-102mm (4 in.) diameter cores	68	C1-C68
Bulk Sampling (91 kg [200 lb.] per sample, AC-C	5	BA20-BA24 from paver
uncompacted), AC-B	5	BA25-BA29 from paver
Bulk Sampling - Asphalt Cement	3	B24-B26 from tanker
Asphalt Treated Base		
Coring-102mm (4 in) diameter cores	36	C1-C4, C27-C44, C55-C68
Bulk Sampling (91 kg [200 lb.] per sample, uncompacted)	3	BT20-BT22 from paver
Bulk Sampling - Asphalt Cement	3	B21-B23 from tanker
Permeable Asphalt Treated Base		
Bulk Sampling (45 kg [100 lb.] per sample, uncompacted)	3	B18-B20 from paver
Uncompacted Unbound Base/Subbase Layers (per layer)		
Bulk Sampling (181 kg [400 lb] each sample)	3	B15-B17
Moisture Content Samples	3	B15-B17
Embankment < 1.2m (4 ft.) Thick		
Bulk Sampling (181 kg [400 lb.] each sample)	7	B8-B14
Moisture Content Samples	7	B8-B14
Subgrade		
Thin-Walled Tube Sampling (*2 tubes)	42	A1-A21
Splitspoon Sampling (only if thin-wall tube cannot be obtained)	21	A1-A21
Bulk Sampling (181 kg [400 lb.] each sample)	7	B1-B7
Moisture Content Samples	7	B1-B7

NOTES:
1. If different AC mixes are used for the surface course and binder course, bulk samples should be obtained from each mix.
2. Bulk samples of asphalt cement shall be obtained for each type of asphalt cement used on the project.

TABLE 4A
DE DOT SPS-1, ELLENDALE, DE
Samples for the Materials Reference Library (MRL)

Item No.	Sample Size	Shipping Containers	Material Description and Sampling Location
1	57 litres (15 gals)	19 litre (5 gal) Epoxy-lined pails 3 required/grade	Asphalt cement from takner or plant, of each grade used
2	208 litres (55 gal) per mix type	208 litre (55 gal) Plastic barrel (1 required for each mix type)	Combined coarse and fine aggregates for each mix type BM-3, IM-1A, IM-1B, SM-2B sampled from charging conveyors at the dryer
3	57 litres (15 gal)	19 litre (5 gal) Epoxy-lined pails 3 required/mix type	Finised mix uncompacted, sampled from paver for each mix type, BM-3, IM-1A, IM-1B, SM-2B

NOTES:

1 Special long-term storage containers will be supplied at no cost to Agencies by the LTPP Materials Reference Library (MRL) by arrangement with Nichols Consulting Engineers Chtd. 1625 Crane Way, Sparks, NV 89431

2 The 55 gal plastic barrel may be replaced by 11-5 gal plastic pails
Stack only 3 high on pallet.

3 Shipping of samples and supply of containers should be arranged by the agency through the MRL

Contacts are -	Rodney Soule	(702) 358-7574
	Jim Nichols	(702) 329-4955
	Cal Berge	(702) 329-5019
		Fax (702) 329-5098

TABLE 5
DE DOT SPS-1 PROJECT 100100, US 113 SB, ELLENDALE, DE
Scope of Field Testing

Material	Number of Tests	Location Designation
Asphalt Concrete		
In-situ density (nuclear gauge)	42	T111-T152
Asphalt Treated Base		
In-situ density (nuclear gauge)	27	T84-T110
Unbound Base/Subbase Layers (per layer)		
In-situ density, moisture content (nuclear gauge)	27	T57-T83
Treated Subgrade		
In-situ density, moisture content (nuclear gauge)	49	T8-T56
Subgrade		
In-situ density, moisture content	7	T1-T7
Shoulder auger probe	14	SI-S14

TABLE 6
DE DOT SPS-1, US 113 SB, ELLENDALE, DE - STATE LABORATORY
Tracking Table for Testing of Subgrade Materials

TEST SECTION I.D.	SAMPLE LOCATION I.D.	CONSTR. STA.	OFFSET m (ft)	LAB. TEST NO.	SAMPLE NO.	SAMPLE DESCRIPTION	HANDLING AND TESTING SEQUENCE					
							FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
100107	A1	421+50	8'	3	TS01	Shelby Tube Sample	SS04/P52	SS08/P56	SS10/P54			
100107	A3	418+50	8'	3	TS05	Shelby Tube Sample	SS04/P52	SS11/P57				
100102	A4	407+50	8'	3	TS07	Shelby Tube Sample	SS04/P52	SS08/P56	SS10/P54			
100102	A6	404+50	8'	3	TS11	Shelby Tube Sample	SS04/P52					
100103	A7	390+50	8'	3	TS13	Shelby Tube Sample	SS04/P52	SS11/P57				
100103	A8	389+00	8'	3	TS15	Shelby Tube Sample	SS04/P52	SS08/P56	SS10/P54			
100112	A10	378+50	8'	3	TS19	Shelby Tube Sample	SS04/P52	SS08/P56	SS10/P54			
100112	A12	373+50	8'	3	TS23	Shelby Tube Sample	SS04/P52					
100108	A13	362+50	8'	3	TS25	Shelby Tube Sample	SS04/P52	SS08/P56	SS10/P54			
100108	A15	359+50	8'	3	TS29	Shelby Tube Sample	SS04/P52					
100159	A16	348+50	8'	3	TS31	Shelby Tube Sample	SS04/P52	SS08/P56	SS10/P54			
100159	A18	345+50	8'	3	TS35	Shelby Tube Sample	SS04/P52	SS11/P57				
100107	A1	421+50	8'	3	TS02	Shelby Tube Spare						
100107	A3	418+50	8'	3	TS06	Shelby Tube Spare						
100102	A4	407+50	8'	3	TS08	Shelby Tube Spare						
100102	A6	404+50	8'	3	TS12	Shelby Tube Spare						
100103	A7	390+50	8'	3	TS14	Shelby Tube Spare						
100103	A8	389+00	8'	3	TS16	Shelby Tube Spare						
100112	A10	378+50	8'	3	TS20	Shelby Tube Spare						
100112	A12	373+50	8'	3	TS24	Shelby Tube Spare						
100108	A13	362+50	8'	3	TS26	Shelby Tube Spare						
100108	A15	359+50	8'	3	TS30	Shelby Tube Spare						
100159	A16	348+50	8'	3	TS32	Shelby Tube Spare						
100159	A18	345+50	8'	3	TS36	Shelby Tube Spare						
100104	A19	335+25	8'	3	TS37	Shelby Tube Spare						
100104	A19	335+25	8'	3	TS38	Shelby Tube Spare						
100104	A20	333+75	8'	3	TS39	Shelby Tube Spare						
100104	A20	333+75	8'	3	TS40	Shelby Tube Spare						
100104	A21	332+25	8'	3	TS41	Shelby Tube Spare						

TABLE 6A
DE DOT SPS-1, US 113 SB, ELLENDALE, DE - FHWA-LTPP CONTRACTOR
Tracking Table for Testing of Subgrade Materials

TEST SECTION I.D.	SAMPLE LOCATION I.D.	CONSTR. STA.	OFFSET m (ft)	LAB. TEST NO.	SAMPLE NO.	SAMPLE DESCRIPTION	HANDLING AND TESTING SEQUENCE					
							FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
100107	B1	423+00	6'	1	BS01	136 kg (300 lb) Sample	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46
100102	B2	403+00	6'	1	BS02	136 kg (300 lb) Sample	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46
100103	B3	392+00	6'	1	BS03	136 kg (300 lb) Sample	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46
100112	B4	378+00	6'	1	BS04	136 kg (300 lb) Sample	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46
100108	B5	364+00	6'	1	BS05	136 kg (300 lb) Sample	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46
100159	B6	350+00	6'	1	BS06	136 kg (300 lb) Sample	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46
100104	B7	336+75	6'	1	BS07	136 kg (300 lb) Sample	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46
100107	B1	423+00	6'	1	MS01	Moisture Jar Sample	SS09/P49					
100102	B2	409+00	6'	1	MS02	Moisture Jar Sample	SS09/P49					
100103	B3	392+00	6'	1	MS03	Moisture Jar Sample	SS09/P49					
100112	B4	378+00	6'	1	MS04	Moisture Jar Sample	SS09/P49					
100108	B5	364+00	6'	1	MS05	Moisture Jar Sample	SS09/P49					
100159	B6	350+00	6'	1	MS06	Moisture Jar Sample	SS09/P49					
100104	B7	336+75	6'	1	MS07	Moisture Jar Sample	SS09/P49					
100107	A2	420+00	8'	3	TS03	Shelby Tube Sample	SS04/P52	SS07/P46				
100102	A5	406+00	8'	3	TS09	Shelby Tube Sample	SS04/P52	SS07/P46				
100103	A9	387+50	8'	3	TS17	Shelby Tube Sample	SS04/P52	SS07/P46				
100112	A11	375+00	8'	3	TS21	Shelby Tube Sample	SS04/P52	SS07/P46				
100108	A14	361+00	8'	3	TS27	Shelby Tube Sample	SS04/P52	SS07/P46				
100159	A17	347+00	8'	3	TS33	Shelby Tube Sample	SS04/P52	SS07/P46				
100104	A19	335+25	8'	3	TS37	Shelby Tube Sample	SS04/P52	SS07/P46				
100107	A2	420+00	8'	3	TS04	Shelby Tube Spare						
100102	A5	406+00	8'	3	TS10	Shelby Tube Spare						
100103	A9	387+50	8'	3	TS18	Shelby Tube Spare						
100112	A11	375+00	8'	3	TS22	Shelby Tube Spare						
100108	A14	361+00	8'	3	TS28	Shelby Tube Spare						
100159	A17	347+00	8'	3	TS34	Shelby Tube Spare						

TABLE 7
DE DOT SPS-1, US 113 SB, ELLENDALE, DE - STATE LABORATORY
Tracking Table for Testing of Embankment Materials

TEST SECTION I.D.	SAMPLE LOCATION I.D.	CONSTR. STA.	OFFSET m (ft)	LAB. TEST NO.	SAMPLE NO.	SAMPLE DESCRIPTION	HANDLING AND TESTING SEQUENCE					
							FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
100107	B8	423+00	1.5	1	BS08	181 kg Bulk Sample	UG09/P48					
100102	B9	403+00	1 5	2	BS09	181 kg Bulk Sample	UG09/P48					
100103	B10	392+00	1.5	1	BS10	181 kg Bulk Sample	UG09/P48					
100112	B11	378+00	1 5	1	BS11	181 kg Bulk Sample	UG09/P48					
100108	B12	364+00	1.5	1	BS12	181 kg Bulk Sample	UG09/P48					
100159	B13	350+00	1 5	1	BS13	181 kg Bulk Sample	UG09/P48					
100104	B14	336+75	1.5	1	BS14	181 kg Bulk Sample	UG09/P48					

TABLE 7A
DE DOT SPS-1, US 113 SB, ELLENDALE, DE - FHWA-LTPP CONTRACTOR LABORATORY
Tracking Table for Testing of Embankment Materials

TEST SECTION I.D.	SAMPLE LOCATION I.D.	CONSTR. STA.	OFFSET m (ft)	LAB. TEST NO.	SAMPLE NO.	SAMPLE DESCRIPTION	HANDLING AND TESTING SEQUENCE					
							FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
100107	B8	423+00	1.5 (5')	1	BS08	181 kg Bulk Sample	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46
100102	B9	403+00	1.5 (5')	2	BS09	181 kg Bulk Sample	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46
100103	B10	392+00	1.5 (5')	1	BS10	181 kg Bulk Sample	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46
100112	B11	378+00	1.5 (5')	1	BS11	181 kg Bulk Sample	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46
100108	B12	364+00	1.5 (5')	1	BS12	181 kg Bulk Sample	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46
100159	B13	350+00	1.5 (5')	1	BS13	181 kg Bulk Sample	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46
100104	B14	336+75	1.5 (5')	1	BS14	181 kg Bulk Sample	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55	SS07/P46
100107	B8	423+00	1.5 (5')	1	MS08	Moisture Jar Sample	SS09/P49					
100102	B9	403+00	1.5 (5')	2	MS09	Moisture Jar Sample						
100103	B10	392+00	1.5 (5')	1	MS10	Moisture Jar Sample						
100112	B11	378+00	1.5 (5')	1	MS11	Moisture Jar Sample						
100108	B12	364+00	1.5 (5')	1	MS12	Moisture Jar Sample						
100159	B13	350+00	1.5 (5')	1	MS13	Moisture Jar Sample						
100104	B14	336+75	1.5 (5')	1	MS14	Moisture Jar Sample						

TABLE 8
DE DOT SPS-1, US 113 SB, ELLENDALE, DE - STATE LABORATORY
Tracking Table for Testing of Unbound Granular Base

TEST SECTION I.D.	SAMPLE LOCATION I.D.	CONSTR. STA.	OFFSET m (ft)	LAB. TEST NO.	SAMPLE NO.	SAMPLE DESCRIPTION	HANDLING AND TESTING SEQUENCE					
							FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
100102	B15	403+20	6'	2	BG01	181 kg (400 lb) Sample	UG09/P48					
100101	B16	396+20	6'	2	BG02	181 kg (400 lb) Sample	UG09/P48					
100159	B17	344+20	6'	2	BG03	181 kg (400 lb) Sample	UG09/P48					

TABLE 8A
DE DOT SPS-1, US 113 SB, ELLENDALE, DE - FHWA-LTPP CONTRACTOR
Tracking Table for Testing of Unbound Granular Base

TEST SECTION I.D.	SAMPLE LOCATION I.D.	CONSTR. STA.	OFFSET m (ft)	LAB. TEST NO.	SAMPLE NO.	SAMPLE DESCRIPTION	HANDLING AND TESTING SEQUENCE					
							FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
100102	B15	403+20	6'	2	BG01	136 kg (300 lb) Sample	UG01/P41	UG02/P41	UG04/P43	UG08/P47	UG05/P44	UG07/P46
100101	B16	396+20	6'	2	BG02	136 kg (300 lb) Sample	UG01/P41	UG02/P41	UG04/P43	UG08/P47	UG05/P44	UG07/P46
100159	B17	344+20	6'	2	BG03	136 kg (300 lb) Sample	UG01/P41	UG02/P41	UG04/P43	UG08/P47	UG05/P44	UG07/P46
100102	B15	403+20	6'	2	MG01	Moisture Jar Sample	UG10/P49					
100101	B16	396+20	6'	2	MG02	Moisture Jar Sample	UG10/P49					
100159	B17	344+20	6'	2	MG03	Moisture Jar Sample	UG10/P49					

TABLE 9
DE DOT SPS-1, US 113 SB, ELLENDALE, DE - STATE LABORATORY
Tracking Table for Testing of Permeable Asphalt Treated Base

TEST SECTION I.D.	SAMPLE LOCATION I.D.	CONSTR. STA.	OFFSET m (ft)	LAB. TEST NO.	SAMPLE NO.	SAMPLE DESCRIPTION	HANDLING AND TESTING SEQUENCE					
							FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
100107	B18	420+00	—	3	BT01	45 kg (100 lb) Paver	AC04/P04	AG04/P14				
100111	B19	382+00	—	3	BT02	45 kg (100 lb) Paver	AC04/P04	AG04/P14				
100109	B20	354+00	—	3	BT03	45 kg (100 lb) Paver	AC04/P04	AG04/P14				

TABLE 10
DE DOT SPS-1, US 113 SB, ELLENDALE, DE - STATE LABORATORY
Tracking Table for Testing of Asphalt Treated Base and Binder

TEST SECTION I.D.	SAMPLE LOCATION I.D.	CONSTR. STA.	OFFSET m (ft)	LAB. TEST NO.	SAMPLE NO.	SAMPLE DESCRIPTION	HANDLING AND TESTING SEQUENCE					
							FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
100103	BT20	389+00	---	3	BT20	91 kg (200 lb) Paver	AC03/P03	AC04/P04	AC05/P05			
100110	BT21	368+00	---	3	BT21	91 kg (200 lb) Paver						
100104	BT22	333+75	---	3	BT22	91 kg (200 lb) Paver						
EXTRACTED AGGREGATE												
100103	BT20	389+00	---	3	BT20	Extracted Aggregate	AG04/P14	AG01/P11	AG02/P12	AG05/P14A		
100110	BT21	368+00	---	3	BT21	Extracted Aggregate						
100104	BT22	333+75	---	3	BT22	Extracted Aggregate						
ASPHALT CEMENT (Abson Recovery)												
100103	BT20	389+00	---	3	BT20	Recovered AC	AE01/P21	AE02/P22	AE03/P23	AE04/P24	AE05/P25	
100110	BT21	368+00	---	3	BT21	Recovered AC	AE01/P21	AE02/P22	AE03/P23	AE04/P24	AE05/P25	
100104	BT22	333+75	---	3	BT22	Recovered AC	AE01/P21	AE02/P22	AE03/P23	AE04/P24	AE05/P25	
ASPHALT CEMENT (From Tanker)												
	B21				BC01	AC Tank Sample (19L)	AE02/P22	AE03/P23	AE04/P24	AE05/P25		
	B22				BC02	AC Tank Sample (19L)	AE02/P22	AE03/P23	AE04/P24	AE05/P25		
	B23				BC03	AC Tank Sample (19L)	AE02/P22	AE03/P23	AE04/P24	AE05/P25		

TABLE 10A
DE DOT SPS-1, US 113 SB, ELLENDALE, DE - FHWA-LTPP CONTRACTOR
Tracking Table for Testing of Asphalt Treated Base (BCBC)

TEST SECTION I.D.	SAMPLE LOCATION I.D.	CONSTR. STA.	OFFSET m (ft)	LAB. TEST NO.	SAMPLE NO.	SAMPLE DESCRIPTION	HANDLING AND TESTING SEQUENCE					
							FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
100103	C27	391+75	1.8 (6)	1	CA27	4" O D Core	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C28	391+75	0 9 (3)	1	CA28	4" O.D Core	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C29	386+25	1.8 (6)	2	CA29	4" O D Core	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C30	386+25	0 9 (3)	2	CA30	4" O D Core	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
100112	C35	377+75	2.3 (7 5)	1	CA35	4" O.D. Core	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C36	377+75	1.8 (6)	1	CA36	4" O.D. Core	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C37	377+75	1.4 (4 5)	1	CA37	4" O D Core	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C38	377+75	0.9 (3)	1	CA38	4" O D. Core	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
100106	C59	342+75	2.3 (7.5)	1	CA59	4" O D. Core	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C60	342+75	1.8 (6)	1	CA60	4" O D Core	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C61	342+75	1.4 (4 5)	1	CA61	4" O D. Core	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C62	342+75	0.9 (3)	1	CA62	4" O D. Core	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C63	337+25	1.8 (6)	2	CA63	4" O D Core Spare	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		

TABLE 11
DE DOT SPS-1, US 113 SB, ELLENDALE, DE - STATE LABORATORY
Tracking Table for Testing of Asphalt Concrete Surface and Binder

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TEST SECTION I.D.	SAMPLE LOCATION I.D.	CONSTR. STA.	OFFSET m (ft)	LAB. TEST NO.	SAMPLE NO.	SAMPLE DESCRIPTION	HANDLING AND TESTING SEQUENCE					
							FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
100160	C1	429+75	1.8 (6')	1	CA01	4" O D Cores	AC01/P01	AC02/P02				
	C2	429+75	0.9 (3')	1	CA02	4" O D. Cores	AC01/P01	AC02/P02				
	C3	424+25	1.8 (6')	2	CA03	4" O D Cores	AC01/P01	AC02/P02				
	C4	424+25	0.9 (3')	2	CA04	4" O D Cores	AC01/P01	AC02/P02				
100107	C10	417+25	0 9 (3)	2	C10	4" O D Cores	AC01/P01	AC02/P02				
100105	C15	410+25	1.8 (6)	2	CA15	4" O D Cores	AC01/P01	AC02/P02				
	C16	410+25	0.9 (3)	2	CA16	4" O.D. Cores	AC01/P01	AC02/P02				
100102	C17	408+75	1.8 (6)	1	CA17	4" O D. Cores	AC01/P01	AC02/P02				
	C18	408+75	0 9 (3)	1	CA18	4" O D Cores	AC01/P01	AC02/P02				
	C19	403+25	1.8 (6)	2	CA19	4" O.D. Cores	AC01/P01	AC02/P02				
	C20	403+25	0.9 (3)	2	CA20	4" O D. Cores	AC01/P01	AC02/P02				
100101	C26	396+25	0.9 (3)	2	CA26	4" O D Cores	AC01/P01	AC02/P02				
100111	C31	384+75	1.8 (6)	1	CA31	4" O D Cores	AC01/P01	AC02/P02				
	C32	384+75	0.9 (3)	1	CA32	4" O D. Cores	AC01/P01	AC02/P02				
	C33	379+25	1.8 (6)	2	CA33	4" O D Cores	AC01/P01	AC02/P02				
	C34	379+25	0.9 (3)	2	CA34	4" O D Cores	AC01/P01	AC02/P02				
100112	C39	372+25	1.8 (6)	2	CA39	4" O D Cores	AC01/P01	AC02/P02				
	C40	372+25	0 9 (3)	2	CA40	4" O D. Cores	AC01/P01	AC02/P02				
100110	C41	370+75	1.8 (6)	1	CA41	4" O D. Cores	AC01/P01	AC02/P02				
	C42	270+75	0 9 (3)	1	CA42	4" O D. Cores	AC01/P01	AC02/P02				
	C43	365+25	1 8 (6)	2	CA43	4" O D Cores	AC01/P01	AC02/P02				
	C44	365+25	0.9 (3)	2	CA44	4" O D Cores	AC01/P01	AC02/P02				

TABLE 11 (Cont.)
DE DOT SPS-1, US 113 SB, ELLENDALE, DE - STATE LABORATORY
Tracking Table for Testing of Asphalt Concrete Surface and Binder

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TEST SECTION I.D.	SAMPLE LOCATION I.D.	CONSTR. STA.	OFFSET m (ft)	LAB. TEST NO.	SAMPLE NO.	SAMPLE DESCRIPTION	HANDLING AND TESTING SEQUENCE					
							FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
100108	C50	358+25	0.9 (3)	2	CA50	4" O D Core	AC01/P01	AC02/P02				
100109	C51	356+75	1.8 (6)	1	CA51	4" O D Core	AC01/P01	AC02/P02				
	C52	356+75	0.9 (3)	1	CA52	4" O D. Core	AC01/P01	AC02/P02				
	C53	351+25	1.8 (6)	2	CA53	4" O D Core	AC01/P01	AC02/P02				
	C54	351+25	0.9 (3)	2	CA54	4" O D. Core	AC01/P01	AC02/P02				
100159	C55	349+75	1.8 (6)	2	CA55	4" O.D Core	AC01/P01	AC02/P02				
	C56	349+75	0.9 (3)	1	CA56	4" O D Core	AC01/P01	AC02/P02				
	C57	344+25	1.8 (6)	1	CA57	4" O D. Core	AC01/P01	AC02/P02				
	C58	344+25	0.9 (3)	2	CA58	4" O D Core	AC01/P01	AC02/P02				
100106	C64	337+25	0.9 (3)	2	CA64	4" O D Core	AC01/P01	AC02/P02				
100104	C65	336+50	1.8 (6)	2	CA65	4" O D. Core	AC01/P01	AC02/P02				
	C66	336+50	0 9 (3)	1	CA66	4" O D Core	AC01/P01	AC02/P02				
	C67	331+00	1.8 (6)	1	CA67	4" O D. Core	AC01/P01	AC02/P02				
	C68	331+00	0.9 (3)	2	CA68	4" O D. Core	AC01/P01	AC02/P02				
100160	BA20	428+00	---	3	BA20	91 kg (200 lb.) Paver	AC01/P01	AC02/P02	AC04/P04			
100107	BA21	421+00	---	3	BA21	91 kg (200 lb.) Paver	AC01/P01	AC02/P02	AC04/P04			
100111	BA22	383+00	---	3	BA22	91 kg (200 lb) Paver	AC01/P01	AC02/P02	AC04/P04			
100110	BA23	369+00	---	3	BA23	91 kg (200 lb) Paver	AC01/P01	AC02/P02	AC04/P04			
100106	BA24	341+00	---	3	BA24	91 kg (200 lb.) Paver	AC01/P01	AC02/P02	AC04/P04			
100160	BA25	426+00	---	3	BA25	91 kg (200 lb) Paver	AC01/P01	AC02/P02	AC04/P04			
100107	BA26	419+00	---	3	BA26	91 kg (200 lb) Paver	AC01/P01	AC02/P02	AC04/P04			
100111	BA27	381+00	---	3	BA27	91 kg (200 lb.) Paver	AC01/P01	AC02/P02	AC04/P04			
100110	BA28	367+00	---	3	BA28	91 kg (200 lb) Paver	AC01/P01	AC02/P02	AC04/P04			
100106	BA29	339+00	---	3	BA29	91 kg (200 lb) Paver	AC01/P01	AC02/P02	AC04/P04			

TABLE 11 (Cont.)
DE DOT SPS-1, US 113 SB, ELLENDALE, DE - STATE LABORATORY
Tracking Table for Testing of Asphalt Concrete Surface and Binder

Sheet 3/4

TEST SECTION I.D.	SAMPLE LOCATION I.D.	CONSTR. STA.	OFFSET m (ft)	LAB. TEST NO.	SAMPLE NO.	SAMPLE DESCRIPTION	HANDLING AND TESTING SEQUENCE					
							FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
RECOVERED ASPHALT CEMENT												
100160	BA20	428+00	---	3	BA20	Recovered Asphalt	AE01/P21	AE02/P22	AE03/P23	AE04/P24	AE05/P25	
100107	BA21	421+00	---	3	BA21	Recovered Asphalt	AE01/P21	AE02/P22	AE03/P23	AE04/P24	AE05/P25	
100111	BA22	383+00	---	3	BA22	Recovered Asphalt	AE01/P21	AE02/P22	AE03/P23	AE04/P24	AE05/P25	
100110	BA23	369+00	---	3	BA23	Recovered Asphalt	AE01/P21	AE02/P22	AE03/P23	AE04/P24	AE05/P25	
100106	BA24	341+00	---	3	BA24	Recovered Asphalt	AE01/P21	AE02/P22	AE03/P23	AE04/P24	AE05/P25	
100160	BA25	426+00	---	3	BA25	Recovered Asphalt	AE01/P21	AE02/P22	AE03/P23	AE04/P24	AE05/P25	
100107	BA26	419+00	---	3	BA26	Recovered Asphalt	AE01/P21	AE02/P22	AE03/P23	AE04/P24	AE05/P25	
100111	BA27	381+00	---	3	BA27	Recovered Asphalt	AE01/P21	AE02/P22	AE03/P23	AE04/P24	AE05/P25	
100110	BA28	367+00	---	3	BA28	Recovered Asphalt	AE01/P21	AE02/P22	AE03/P23	AE04/P24	AE05/P25	
100106	BA29	339+00	---	3	BA29	Recovered Asphalt	AE01/P21	AE02/P22	AE03/P23	AE04/P24	AE05/P25	
EXTRACTED AGGREGATE												
100160	BA20	428+00	---	3	BA20	Extracted Aggregate	AG04/P14	AG01/P11	AG02/P12	AG05/P14A		
100107	BA21	421+00	---	3	BA21	Extracted Aggregate	AG04/P14	AG01/P11	AG02/P12	AG05/P14A		
100111	BA22	383+00	---	3	BA22	Extracted Aggregate	AG04/P14	AG01/P11	AG02/P12	AG05/P14A		
100110	BA23	369+00	---	3	BA23	Extracted Aggregate	AG04/P14	AG01/P11	AG02/P12	AG05/P14A		
100106	BA24	341+00	---	3	BA24	Extracted Aggregate	AG04/P14	AG01/P11	AG02/P12	AG05/P14A		
100160	BA25	426+00	---	3	BA25	Extracted Aggregate	AG04/P14	AG01/P11	AG02/P12	AG05/P14A		
100107	BA26	419+00	---	3	BA26	Extracted Aggregate	AG04/P14	AG01/P11	AG02/P12	AG05/P14A		
100111	BA27	381+00	---	3	BA27	Extracted Aggregate	AG04/P14	AG01/P11	AG02/P12	AG05/P14A		
100110	BA28	367+00	---	3	BA28	Extracted Aggregate	AG04/P14	AG01/P11	AG02/P12	AG05/P14A		
100106	BA29	339+00	---	3	BA29	Extracted Aggregate	AG04/P14	AG01/P11	AG02/P12	AG05/P14A		

TABLE 11 (Cont.)
DE DOT SPS-1, US 113 SB, ELLENDALE, DE - STATE LABORATORY
Tracking Table for Testing of Asphalt Concrete Surface and Binder

Sheet 4/4

TEST SECTION I.D.	SAMPLE LOCATION I.D.	CONSTR. STA.	OFFSET m (ft)	LAB. TEST NO.	SAMPLE NO.	SAMPLE DESCRIPTION	HANDLING AND TESTING SEQUENCE					
							FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
ASPHALT CEMENT												
	B24				BC04	19L (5 gal.) Tanker	AE02/P22	AE03/P23	AE04/P24	AE05/P25		
	B25				BC05	19L (5 gal) Tanker	AE02/P22	AE03/P23	AE04/P24	AE05/P25		
	B26				BC06	19L (5 gal) Tanker	AE02/P22	AE03/P23	AE04/P24	AE05/P25		

TABLE 11A
DE DOT SPS-1, US 113 SB, ELLENDALE, DE - FHWA-LTPP CONTRACTOR
Tracking Table for Testing of Asphalt Concrete Surface (ACC) and Binder (ACB)

TEST SECTION I.D.	SAMPLE LOCATION I.D.	CONSTR. STA.	OFFSET m (ft)	LAB. TEST NO.	SAMPLE NO.	SAMPLE DESCRIPTION	HANDLING AND TESTING SEQUENCE					
							FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
100107	C5	422+75	2.3 (7.5)	1	CA05	4" O D. Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C6	422+75	1.8 (6)	1	CA06	4" O D. Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C7	422+75	1.4 (4 5)	1	CA07	4" O D. Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C8	422+75	0.9 (3)	1	CA08	4" O D Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C9	417+25	1 8 (6)	2	CA09	4" O D. Cores	AC01/P01	AC02/P02	AC06/P06			
100105	C11	415+75	2.3 (7.5)	1	CA11	4" O D. Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C12	415+75	1.8 (6)	1	CA12	4" O D Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C13	415+75	1.4 (4.5)	1	CA13	4" O.D. Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C14	415+75	0.9 (3)	1	CA14	4" O D. Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
100101	C21	401+75	2.3 (7 5)	1	CA21	4" O D. Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C22	401+75	1.8 (6)	1	CA22	4" O D. Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C23	401+75	1.4 (4.5)	1	CA23	4" O D. Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C24	401+75	0.9 (3)	1	CA24	4" O D. Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C25	396+25	1.8 (6)	2	CA25	4" O.D. Cores	AC01/P01	AC02/P02	AC06/P06			
100112	C35	377+75	2.3 (7.5)	1	CA35	4" O D. Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C36	377+75	1.8 (6)	1	CA36	4" O D. Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C37	377+75	1.4 (4.5)	1	CA37	4" O D. Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C38	377+75	0 9 (3)	1	CA38	4" O.D Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
100108	C45	363+75	2.3 (7.5)	1	CA45	4" O D. Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C46	363+75	1.8 (6)	1	CA46	4" O D Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C47	363+75	1.4 (4.5)	1	CA47	4" O D. Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C48	363+75	0 9 (3)	1	CA48	4" O D. Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C49	358+25	1.8 (6)	2	CA49	4" O D. Cores	AC01/P01	AC02/P02	AC06/P06			
100106	C59	342+75	2.3 (7 5)	1	CA59	4" O D. Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C60	342+75	1.8 (6)	1	CA60	4" O D. Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C61	342+75	1.4 (4.5)	1	CA61	4" O D. Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C62	342+75	0.9 (3)	1	CA62	4" O D. Cores	AC01/P01	AC02/P02	AC07/P07	AC07/P07 (ITS)		
	C63	337+25	1.8 (6)	2	CA63	4" O D. Cores	AC01/P01	AC02/P02	AC06/P06			

TABLE 12
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Materials Reference Library Sampling

Materials	Sample Location	Sample Size	Remarks
Coarse and Fine Aggregate			
Co. & F. Agg (combined)	Tilcon 6 Plant	11-5 gal. pails	For BCBC and ACB
Co. & F. Agg (combined)	Tilcon 6 Plant	11-5 gal. pails	For ACC
Bulk Hot Mix Samples			
BCBC	Road	3-5 gal. pails	Taken in third of 3 lifts
ACB	Road	3-5 gal. pails	Taken in first of 2 lifts
PATB	Road	3-5 gal pails	From Tilcon 4 Plant
ACC	Road	3-5 gal. pails	One lift only
Additive			
AC20	Tanker	3-5 gal. pails	AC 20 from Sun Marketing, PA was used on all layers

TABLE 13
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Bulk Subgrade Samples

Date of Sample	Test Section	Sample		Station		Top HM to Top Subg.-ins.	Depth of Pvmt. Struc.-ins.
		Location	Number	Const.	SHRP-ft.		
10/05/94	100107	B1	BS01	423+00	0-50	30"	12"
10/06/94	100102	B2	BS02	403+25	5+25	56"	16"
10/21/94	100103	B3	BS03	392+00	0-50	52"	12"
10/21/94	100112	B4	BS04	378+00	0-50	43"	20"
10/19/94	100108	B5	BS05	364+00	0-50	40"	19"
10/12/94	100159	B6	BS06	350+00	0-50	35"	20"
10/12/94	100104	B7	BS07	336+50	0-25	19"	19"

TABLE 14
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Bulk Embankment Samples

Date of Sample	Test Section	Sample		Station		Top HM to Top Emb.-ins.	Depth of Pvmt. Struc.-ins.
		Location	Number	Const.	SHRP-ft.		
05/15/95	100107	B8	BS08	423+00	0-50	12"	12"
05/15/95	100102	B9	BS09	403+00	5+50	16"	16"
05/16/95	100103	B10	BS10	392+00	0-50	12"	12"
05/16/95	100112	B11	BS11	378+00	0-50	20"	20"
Not Sampled	100108	B12					20"
05/16/95	100159	B13	BS13	350+00	0-50	20"	
Subgrade	100104	B14		No Embankment			

TABLE 15
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Nuclear Density/Moisture/Compacted Test Results
Subgrade, Embankment and Bituminous Courses

Test Section	Subgrade		Embankment				Top of DGAB		Top of BCBC		Top of ACB		Top of ACC	
	Sample Location		Sample Location		Test Section									
	Dens. #/cu.ft.	Moist. %	Dens. #/cu.ft.	Moist. %	Dens. #/cu.ft.	Moist. %	Dens. #/cu.ft.	Moist. %	Dens. #/cu.ft.	Comp. %	Dens. #/cu.ft.	Comp. %	Dens. #/cu.ft.	Comp. %
100104	115 2 B7	10.1			124.3	7.5			144.7	98.7	142 2	95.8	148 8	96 2
100106					125.6	7.7	152.3	5.9	146.8	100.1	138.1	93.1	148.0	95.5
100159	118.1 B6	15.2	127.9 B13	8.4	125.1	6.4	160.5	5.2	145.3	99.1	139.9	94.2	147.6	95.4
100109					125.6	7.0	154.7	5.4			140.1	94.4	148.7	96.0
100108	111.0 B5	14.0	None	None	127.5	6.7	153.8	5.1			137.7	93.1	148.4	95.9
100110					126.0	5.7			153.4	104.0	137.1	92.7	147.7	95.4
100112	130.0 B4	14.7	135.5 B11	7.9	126.4	5 3			151.2	102 3	140.8	95.1	149.7	96.6
100111					128.6	7.0			149.8	101.3	140.2	94.7	150.0	96.8
100103	129.9 B3	12.7	132.5 B10	8.0	129.1	6.8			144.3	97.8	141.5	95.6	146.0	95.5
100101					126.2	7.6	157.7	6.3			138.5	93.6	147.3	95.1
100102	131.4 B2	9 8	128.6 B9	10.6	126.6	7.0	160.0	5.7			143.1	97.3	150.2	96.9
100105					127.3	6.6	151.6	4.6	148.0	99.3	145.7	98.0	149.7	96.6
100107	129.5 B1	14.5	128.5 B8	12.0	127.4	4.9	145.7	4.9			145.9	98.1	147.3	95.1
100160					128.9	7.9	94.6*	35.7*	149.7	101 3	146.9	100.6	147.4	95.2

oal Ash Stabilized Base

TABLE 16
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Sampling, Field Testing and Construction Dates

Activity	Test Sections													
	4	6	59	9	8	10	12	11	3	1	2	5	7	60
Subgrade														
Bulk Samples	10/94		10/94		10/94		10/94		10/94		10/94		10/94	
Shelby Tube	5/9/95												5/4/95	
Embankment														
Box Grade	5/1/95		5/95		6/5/95	6/29/95	4/95	4/95	4/95	4/95	4/95	4/95	4/95	4/95
Grade Aprvd	6/19/95	6/21/95	6/21/95	6/20/95	6/20/95	8/4/95	8/4/95	8/4/95	6/8/95	6/1/95	5/31/95	5/25/95	6/30/95	5/23/95
Bulk Sample	cut		5/16/95		no		5/16/95		5/16/95		5/15/95		5/15/95	
Shelby Tube	5/9/95		5/9/95		6/6/95		5/8/95		5/8/95		5/4/95		5/4/95	
5 Pt Level	6/19/95	6/21/95	6/21/95	6/20/95	6/20/95	8/4/95	8/4/95	8/4/95	6/8/95	6/1/95	5/31/95	5/25/95	6/30/95	5/23/95
Dens. & Moist	6/19/95	6/22/95	6/22/95	6/20/95	6/20/95	6/30/95	6/30/95	6/30/95	6/8/95	6/1/95	5/31/95	5/25/95	6/30/95	5/23/95
FWD						6/29/95	5/9/95	5/9/95	5/9/95	5/9/95	5/9/95	5/9/95	5/9/95	5/19/95
Shoulder Probe		5/16/95							5/16/95		5/16/95			
Bases														
DGAB														
Depth (ins)		4	8	12	8					8	12	4	4	
Placed Lift 1		6/22/95	6/22/95	6/21/95	6/21/95					6/2/95	5/31/95	5/30/95	7/1/95	
Placed Lift 2			7/5/95	7/5/95	7/11/95					6/3/95	6/3/95			
Placed Lift 3				7/11/95							6/8/95			
Grade Aprvd		6/30/95	7/12/95	8/17/95	8/17/95					7/6/95	7/6/95	7/6/95	8/17/95	
Bulk Sample			7/5/95							6/3/95	6/3/95			
5 Pt Level		7/13/95	7/13/95	8/17/95	8/18/95					7/7/95	7/7/95	7/6/95	8/17/95	
Dens & Moist.		7/13/95	7/13/95	8/18/95	8/18/95					7/7/95	7/6/95	7/6/95	7/7/95	
FWD		6/29/95								6/29/95	6/29/95	6/29/95	7/5/95	
BCBC (ATB)														
Depth (ins)	12	8	6			4	12	8	8			4		
Placed Lift 1	6/20/95	7/17/95	7/17/95			8/10/95	8/10/95	8/10/95	6/9/95*			7/14/95		6/8/95*
Placed Lift 2	7/17/95	7/19/95[W]	7/19/95[W]			8/15/95[W]	8/15/95[W]	8/15/95[W]	6/15/95					6/9/95*
Placed Lift 3	7/19/95[W]	7/19/95	7/19/95				8/15/95	8/16/95						
Placed Lift 4	7/19/95						8/16/95							
5 Pt Level	7/20/95	7/20/95	7/20/95			8/11/95	8/17/95	8/17/95	6/17/95			7/17/95		6/9/95
Dens & Comp	7/20/95	7/20/95	7/20/95			8/14/95	8/17/95	8/17/95	6/17/95			7/17/95		5/9/95
Bulk Sample	7/19/95					8/10/95			6/15/95*					

TABLE 16 (Cont.)
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Sampling, Field Testing and Construction Dates

Activity	Test Sections													
	4	6	59	9	8	10	12	11	3	1	2	5	7	60
PATB 4"				8/18/95	8/18/95	8/9/95	8/9/95	8/9/95					8/17/95	
Placed				8/19/95	8/19/95	8/10/95	8/10/95	8/10/95					8/18/95	
5 Pt Level				8/18/95				8/9/95					8/17/95	
Bulk Sample														
Coal Ash 6"														
Placed														5/31/95
5 Pt Level														5/31/95
Dens & Comp														5/31/95
FWD														6/7/95
Edge Drains														
Completed				7/24/95	7/25/95	7/25/95	7/26/95	7/26/95					7/27/95	
ACB (Binder)														
Depth (ins)	5 75	5 75	4 75	5.75	5 75	5 75	2 75	2 75	2 75	5 75	2 75	2 75	2 75	4 75
Placed Lift 1	7/20/95	7/20/95	7/20/95	8/19/95	8/19/95	8/19/95	9/8/95^{W**}	9/11/95	7/14/95^{W*}	7/17/95	8/22/95	8/22/95	8/19/95	6/15/95^{W**}
Placed Lift 2	9/9/95	9/9/95	9/9/95	9/8/95^{W**}	9/8/95^{W**}	9/11/95	9/11/95		9/11/95	9/11/95		9/14/95^{W}	9/14/95^{W}	8/9/95
Placed Lift 3				9/9/95	9/11/95									9/14/95^{W}
Bulk Sample		7/20/95				9/11/95		9/11/95					8/19/95	6/15/95
Dens & Comp.	9/10/95	9/11/95	9/11/95	9/11/95	8/19/95	9/12/95	9/12/95	9/12/95	9/12/95	9/12/95	8/23/95	8/23/95	8/21/95	8/22/95
ACC (Surface)														
Depth	1.25	1.25	1 25	1.25	1 25	1 25	1 25	1 25	1 25	1 25	1 25	1 25	1.25	1 25
Placed	9/16/95	9/16/95	9/16/95	9/16/95	9/16/95	9/16/95	9/16/95	9/16/95	9/16/95	9/16/95	9/16/95	9/16/95	9/16/95	9/16/95
5 Pt Level	9/18/95	9/18/95	9/18/95	9/18/95	9/18/95	9/18/95	9/18/95	9/18/95	9/18/95	9/18/95	9/18/95	9/18/95	9/18/95	9/18/95
Dens & Comp	9/19/95	9/19/95	9/19/95	9/19/95	9/19/95	9/19/95	9/19/95	9/19/95	9/19/95	9/18/95	9/18/95	9/18/95	9/18/95	9/18/95
Bulk Sample		9/16/95				9/16/95		9/16/95					9/16/95	9/16/95
4" AC Cores	9/20/95	9/20/95	9/20/95	9/20/95	9/20/95	9/20/95	9/20/95	9/20/95	9/20/95	9/20/95	9/20/95	9/20/95	9/20/95	9/20/95
Pvmt. Markings	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95	10/25/95

W - Wedge
* ACB
** PCC

TABLE 17
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Bulk Dense Graded Aggregate Base Samples

Date of Sample	Test Section	Sample Location	Stations Number	Const.	SHRP	No. of 4" Lifts Placed	Lift of Sample Taken
6/3/95	100102	B15	BG01	403+20	5+50	3	2 (4-8") o/s 18'
6/3/95	100101	B16	BG02	396+20	5+20	2	2 (4-8") o/s 18'
7/5/95	100159	B17	BG03	344+00	5+50	2	2 (4-8") o/s 12'

Note: The location and offsets were adjusted to miss the DGAB that had been watered

TABLE 18
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Edge Drain and Outlet Installation

Test Section	Stations Installation	Date of Drain Installation		Drain Outlets		Remarks
		Inside	Outside	Inside	Outside	
100109	350+50 - 357+50	7/24/95	7/24/95	352+97 356+90	352+97 356+90	DGAB Grade approved 8/17/95
100108	357+50 - 364+50	7/21/95	7/25/95	357+90	357+90	DGAB Grade approved 8/17/95
100110	364+50 - 371+50	7/21/95	7/25/95	364+08	364+08 367+08	Earth Grade approved 8/4/95
100112	371+50 0 378+50	7/21/95	7/26/95	378+35	373+03	Earth Grade approved 8/4/95
100111	378+50 - 385+27	7/20/95	7/26/95		381+15 385+27	Earth Grade approved 8/4/95 Drain at 385+27 crossed road and joined inside drain
100107	416+50 - 423+50	7/27/95	7/26/95	416+50 419+00 421+34	416+50 419+00 421+43	DGAB Grade approved 8/17/95

Edge Drains - 4" ID
Drain Outlets - 6" ID

TABLE 19

STYLE-4552

We wish to advise that **Amoco Style 4552** meets the following minimum roll averages:

Property	Test Method	Minimum Roll Average Value
Grab Tensile, lbs	ASTM-D-4632	180
Grab Elongation, %	ASTM-D-4632	50
Mullen Burst, psi	ASTM-D-3786	350
Puncture, lbs	ASTM-D-4833	105
Trapezoidal Tear, lbs	ASTM-D-4533	70
UV Resistance, %SR/hrs	ASTM-D-4355	70/500
AOS, US Sieve #	ASTM-D-4751	100
Permittivity, 1/sec	ASTM-D-4491	1.5
gal/min/ft^2		105

Amoco Fabrics and Fibers Company purchased Phillips Fibers Corporation in October, 1993. Amoco Fabrics and Fibers Company manufactures Style 4552 in the USA. Style 4552 is the equivalent to Phillips 7NP (L17007).

The values listed are a result of testing conducted in on-site laboratories. A letter certifying the minimum average roll values will be issued from the manufacturing plant by the Quality Control Manager at the time shipment is made.

DATE ISSUED: 05/12/95

TABLE 20
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Mix and Design Designations and Materials Data

Layer Description	DEL DOT Designation		Plant Data		
	Normal	For SPS-1	Name	Type	Average Haul
BCBC - Base Course	306	SPS Mod DL	Tilcon 6	Drum	26
PATB - Base Course		PATB	Tilcon 4	Batch	27
ACB - Binder Course	401B	SPS Mod B	Tilcon 6	Drum	26
ACC - Surface Course	401C	SPS Mod C	Tilcon 3	Drum	26
Aggregate and Material Sources					
Layer Description	**Supplier**		**Material**		**Composition %**
BCBC	Rohrer's Kurtz MD Materials Demco		Crushed Stone Crushed Stone Screenings Fine Aggregate		40 24 21 15
PATB	Downington		Crushed Stone (#57)		100
ACB	Rohrer's Kurtz MD Materials Demco		Crushed Stone Crushed Stone Screenings Fine Aggregate		40 22-24 23-21 15
ACC	MD Materials MD Materials Demco		Crushed Stone Crushed Stone Fine Aggregate		40-52 45-33 15
AC All Layers	Sun Marketing		AC20		100

Note: The same gradation was used for BCBC and ACB BCBC required 4 3% AC with 50 blows and ACB 3 9% with 75 blows

TABLE 21
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Summary of Bituminous Construction Data - Driving Lane

Test Section	Hot Mix Type	Hot Mix Lift	Const. Dates	Plant Name	Haul Distance Miles	Avg. Travel Load/Unload Min.	HM Temp (F) Plant	HM Temp (F) Laydown	Air Temp. F***	Norm. Thick. Ins.	Pav. Width Ft.	Density #/Cu. Ft.	Comp. %
100160	BCBC	1st*	6/8/95	Tilcon 6	25		305	254	85 CDY	3 5	12 5		
		2nd*	6/9/95	Tilcon 6	25	85	305	270	80 CLR	3 5	11.5	149 7	100 3
	ACB	1st**	6/15/95	Tilcon 6	25	90	305	274	80 CLR	2 5	12 5		
		2nd	8/19/95	Tilcon 6	25	90	305	285	82 CLR	3	11 5	146 9	100 6
		3rd[W]	9/14/95	Tilcon 6	25	60	305	290	86 CLR	2 0	12 0		
	ACC	1st	9/16/95	Tilcon 3	25	70	305	299	72 CDY	1.5	12.0	147 4	95 2
100107	PATB	1st	8/17/95	Tilcon 4	25	92	278	217	82 CDY	4 8	11.5		
	ACB	1st	8/19/95	Tilcon 6	25		305	285	82 CLR	3	11 5	145.9	98.1
		2nd[W]	9/14/95	Tilcon 6	25	60	305	287	86 CLR	2 0	12 0		
	ACC	1st	9/16/95	Tilcon 3	25	84	305	297	72 CDY	1 5	12.0	147 3	95 1
100105	BCBC	1st	7/14/95	Tilcon 6	26	55	305	285	95 CDY	4 8	11.5	148 0	99 3
	ACB	1st	8/22/95	Tilcon 6	26	120	305	275	94 CLR	3 5	11 5	145 7	98 0
		2nd[W]	9/14/95	Tilcon 6	26	90	305	295	86 CLR	1 0	12.0		
	ACC	1st	9/16/95	Tilcon 3	26	82	305	291	72 CDY	1 5	12.0	149.7	96 6
100102	ACB	1st	8/22/95	Tilcon 6	26	86	305	281	94 CLR	3 5	11.5	143.1	97 3
	ACC	1st	9/16/95	Tilcon 6	26	43	305	296	72 CDY	1 5	12 0	150 2	96 9
100101	ACB	1st	7/17/95**	Tilcon 6	26	62	305	278	95 CDY	3 8	12 5		
		2nd	9/11/95	Tilcon 6	26	45	305	272	76 CLR	3 0	11 5	138 5	93 6
	ACC	1st	9/16/95	Tilcon 3	26	75	305	284	72 CDY	1 5	12 0	147.3	95 1

*** Clear - CLR
Cloudy - CDY

TABLE 21 (Cont.)
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Summary of Bituminous Construction Data - Driving Lane

Test Section	Hot Mix Type	Hot Mix Lift	Const. Dates	Plant Name	Haul Distance Miles	Avg. Travel Load/Unload Min.	HM Temp (F) Plant	HM Temp (F) Laydown	Air Temp. F***	Norm. Thick. Ins.	Pav. Width Ft.	Density #/Cu. Ft.	Comp. %
100103	BCBC	1st*	6/9/95	Tilcon 6	26	156	305	263	80 CLR	4 5	12 0		
		2nd	6/15/95	Tilcon 6	26	55	305	262	80 CLR	4 7	11 5	144 3	97 8
		3rd[W]	7/14/95	Tilcon 6	26	95	305	236	95 CDY	0 7	12 5		
	ACB	1st	9/11/95	Tilcon 6	26	45	305	285	76 CLR	3 2	11 5	141 5	95 6
	ACC	1st	9/16/95	Tilcon 3	26	75	305	281	72 CDY	1 5	12 0	146 0	95 5
100111	PATB	1st	8/9/95	Tilcon 4	28	120	250	222	78 CDY	5 0	12 0		
	BCBC	1st	8/10/95	Tilcon 6	26	60	305	265	86 CLR	5 5	11.5		
		2nd[W]	8/15/95	Tilcon 6	26	55	305	290	85 CDY	2 5	12 5		
		3rd	8/16/95	Tilcon 6	26	45	305	267	84 CDY	5 0	11 5	149 8	101 3
	ACB	1st	9/11/95	Tilcon 6	26	50	305	288	76 CLR	3 7	11 5	140 2	94 7
	ACC	1st	9/16/95	Tilcon 3	26	45	305	279	72 CDY	1 5	12 0	150 0	96 8
100112	PATB	1st	8/9/95	Tilcon 3	28	50	250	243	78 CDY	4 5	12 0		
	BCBC	1st	8/10/95	Tilcon 6	27	55	305	285	86 CLR	5 5	11.5		
		2nd[W]	8/15/95	Tilcon 6	27	75	305	284	85 CDY	2 0	12 5		
		3rd	8/15/95	Tilcon 6	27	50	305	299	85 CDY	4 0	11 5		
		4th	8/16/95	Tilcon 6	27	60	305	262	84 CDY	5 0	11 5	151.2	102 3
	ACB	1st[W]	9/8/95	Tilcon 6	27		305	279	70 CDY	1 5	11.5		
		2nd	9/11/95	Tilcon 6	27	55	305	282	76 CLR	3 0	11 5	140 8	95 1
	ACC	1st	9/16/95	Tilcon 3	27	42	305	276	72 CDY	1 5	12 0	149.7	96 6
100110	PATB	1st	8/9/95	Tilcon 4	28	50	250	230	78 CDY	4.0	12 0		
	BCBC	1st	8/10/95	Tilcon 6	27	55	305	280	86 CLR	5 2	11 5	153 4	104 0
		2nd[W]	8/15/95	Tilcon 6	27	90	305	265	85 CDY	1 5	12 5		
	ACB	1st	8/19/95	Tilcon 6	27		305	285	82 CLR	4.0	11 5		
		2nd	9/11/95	Tilcon 6	27	75	305	280	76 CLR	3 2	11 5	137 1	92 7
	ACC	1st	9/16/95	Tilcon 3	27	45	305	279	72 CDY	1.5	12.0	147.7	95 4

*** Clear - CLR
Cloudy - CDY

TABLE 21 (Cont.)
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Summary of Bituminous Construction Data - Driving Lane

Test Section	Hot Mix Type	Hot Mix Lift	Const. Dates	Plant Name	Haul Distance Miles	Avg. Travel Load/Unload Min.	HM Temp (F) Plant	HM Temp (F) Laydown	Air Temp. F***	Norm. Thick. Ins.	Pav. Width Ft.	Density #/Cu. Ft.	Comp. %
100108	PATB		8/18/95	Tilcon 4	28	55	250	231	90 CLR	5 0	11 5		
	ACB	1st	8/19/95	Tilcon 6	27		305	285	82 CLR	4 0	11 5		
		2nd[W]	9/8/95	Tilcon 6	27	60	305		70 CDY	1 0	11.5		
		3rd	9/11/95	Tilcon 6	27	45	305	280	76 CLR	3 0	11.5	137 7	93 1
	ACC	1st	9/16/95	Tilcon 3	27	54	305	276	72 CDY	1 5	12.0	148.4	95 9
100109	PATB		8/18/95	Tilcon 4	28	65	301	228	90 CLR	5 2	11 5		
	ACB	1st	8/19/95	Tilcon 6	27		305	285	82 CLR	4 0	11 5		
		2nd[W]	9/8/95	Tilcon 6	27	60			70 CDY	1 0	11 5		
		3rd	9/9/95	Tilcon 6	27	60	305	291	76 CLR	3 0	11.5	140.1	94 4
	ACC	1st	9/16/95	Tilcon 3	27	57	305	278	72 CDY	1 5	12 0	148 7	96 0
100159	BCBC	1st	7/17/95	Tilcon 6	27	46	305	295	95 CDY	4 1	11 5		
		2nd[W]	7/19/95	Tilcon 6	27	58	305	250	91 CLR	1 0	11 5		
		3rd	7/19/95	Tilcon 6	27	55	305	287	91 CLR	3 7	12 5	145 3	99.1
	ACB	1st	7/20/95	Tilcon 6	27	48	305	276	88 CDY	3 0	11 5		
		2nd	9/9/95	Tilcon 6	27	60	305	297	76 CLR	3 0	11 5	139 9	94 2
	ACC	1st	9/16/95	Tilcon 3	27	46	305	282	72 CDY	1 5	12 0	147 6	95 4
100106	BCBC	1st	7/17/95	Tilcon 6	27	53	305	287	95 CDY	4.8	11.5		
		2nd[W]	7/19/95	Tilcon 6	27	100	305	235	91 CLR	1 1	11.5		
		3rd	7/19/95	Tilcon 6	27	68	305	287	91 CLR	4.9	12.5	146.8	100.1
	ACB	1st	7/20/95	Tilcon 6	27	75	305	284	88 CDY	3.6	11.5		
		2nd	9/9/95	Tilcon 6	27	60	305	279	76 CLR	3.0	11 5	138 1	93 1
	ACC	1st	9/16/95	Tilcon 3	27	48	305	282	72 CDY	1.5	12.0	143.0	95.5
100104	BCBC	1st	6/20/95	Tilcon 6	27	63	305	261	90 CLR	5.0	12 0		
		2nd	7/17/95	Tilcon 6	27	75	305	287	95 CDY	5 1	11 5		
		3rd[W]	7/19/95	Tilcon 6	27	125	305	228	91 CLR	0 9	11 5		
		4th	7/19/95	Tilcon 6	27	75	305	287	91 CLR	4.7	12 5	144 7	98 7
	ACB	1st	7/20/95	Tilcon 6	27	80	305	292	88 CDY	3.9	11 5		
		2nd	9/9/95	Tilcon 6	27	60	305	281	76 CLR	3 0	11 5	142 2	95 8
	ACC	1st	9/16/95	Tilcon 3	27	51	305	281	72 CDY	1.5	12.0	148.8	96 2

* ACB instead of BCBC
** BCBC instead of ACB
W - Wedge

*** Clear - CLR
Cloudy - CDY

TABLE 22
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Bulk Bituminous and Aggregate Samples

Material	Test Section	Sample Location	Sample Number	Sample Date 1995	No. of Lifts	Lift of Sample	Quantity* (Pails)	MRL Samples
BCBC	100103	BT20	BT20	6/15/95	2	1st	3-5 gal pails	Placed ACB
(ATB)	100110	BT21	BT21	8/10/95	2	1st	3-5 gal pails	
	100104	BT22	BT22	7/19/95	4	4th	3-5 gal pails	MRL 3-5 gal pails
PATB	100107	B18	BT01	8/17/95	1	1st	2-5 gal pails	
	100111	B19	BT02	8/9/95	1	1st	3-5 gal pails	MRL 3-5 gal pails
	100109	B20	BT03	8/8/95	1	1st	2-5 gal pails	
ACB	100160	BA25	BA25	6/15/95	2	1st	3-5 gal pails	Placed BCBC
	100107	BA26	BA26	8/19/95	2	1st	3-5 gal pails	
	100111	BA27	BA27	9/11/95	1	1st	3-5 gal pails	
	100110	BA28	BA28	9/11/95	2	2nd	3-5 gal pails	
	100106	BA29	BA29	7/20/95	2	1st	3-5 gal pails	MRL 3-5 gal pails
ACC	100160	BA20	BA20	9/16/95	1	1st	3-5 gal pails	
	100107	BA21	BA21	9/16/95	1	1st	3-5 gal pails	
	100111	BA22	BA22	9/16/95	1	1st	3-5 gal pails	MRL 3-5 gal pails
	100110	BA23	BA23	9/16/95	1	1st	3-5 gal pails	
	100106	BA24	BA24	9/16/95	1	1st	3-5 gal pails	
Aggregate								
BCBC and ACB				7/21/95			11-5 gal pails	For MRL Tilcon # 6 Plant
ACC				9/16/95			11-5 gal pails	For MRL Tilcon # 3 Plant
AC		Tanker	B21-B26	7/17/95			3-5 gal pails	For MRL
		Tanker	B21-B26	9/16/95			3-5 gal pails	For DE DOT Used AC 20 for all layers

* for FHWA and DE DOT

TABLE 23
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Bituminous Concrete Plant Reports
Bituminous Concrete Base Course (BCBC)

Sieve Size	Job Mix Tolerance SPS-1 (SHRP)	DE DOT Normal BCBC Mix	Test Sections - Plant Reports, Production Dates & Layer Thickness as Per Plan												
			100160		10005	100103			100111			100112			
			June 8* 3"	June 9* 3"	July 14 4"	June 9* 4"	June 15 4"	July 14 W 1-2"	Aug. 10 4"	Aug. 15 W 1-2"	Aug. 16 4"	Aug. 10 4"	Aug. 15 W 1-2"	Aug. 15 4"	Aug. 16 4"
1-1/2	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1	95-100		98 6	100											
3/4	50-90	75-100	84 6	94 0	92 8	94 0	83 9	92 8	86 9	91 6	89 4	86 9	91 6	91 6	89 4
1/2			70 9	82 4		82 4									
3/8		48-80	62 1	70 8	67 3	70 8	66 0	67 3	59 2	67 9	64 9	59 2	67 9	67 9	64 9
#4	20-50		44 4	53 1		53 1									
#8		20-48	30 3	35 6	31 6	35 6	28 9	31 6	29 7	35 8	29 0	29 7	35 8	35 8	29 0
#10	15-40														
#30	15-40	10-30	15 1	18 7	17 0	18 7	14 8	17 0	16 6	18 3	15 7	16 6	18 3	18 3	15 7
#50		7-25	7 3	9 5	8 4	9 5	7 1	8 4	6 6	8 4	6 8	6 6	8 4	8 4	6 8
#200	0-10	3-10	1 9	2 2	2 3	2 2	1 9	2 3	2 0	3 7	2 3	2 0	3 7	3 7	2 3
% AC	3 5-5 5	3-4 5	3 69	3 8	4 1	3 8	4 28	4 1	4 63	4 69	4 74	4 63	4 69	4 69	4 74
Marshall Properties															
S G. (Rice)			2 612	2 626	2 596	2 626	2 597	2 596	2 605	2 592	2 601	2 605	2 592	2 592	2 601
Unit Wt			155 9	156 5	155 3	156 5	154 1	155 3	156 2	154 8	156 7	156 2	154 8	154.8	156 7
B S G			2 498	2 508	2 490	2 508	2 441	2 490	2 503	2 480	2 511	2 503	2 480	2 480	2 511
% Air Voids	3-5	3-8	4 4	4 5	4 1	4 5	4 8	4 1	3 9	4 20	3 46	3 9	4 20	4 20	3 46
% VMA			13 9	14 0	14 4	14 0	15 2	14 4	14 4	14 5	13 9	14 4	14 5	14 5	13 9
% VFAC			68 2	68 2	71 8	68 2	68 1	71 8	72 7	71 4	75 2	72 7	71 4	71 4	75 2
Flow	8-20	8-18	14 0	13 6	14 0	13 6	12 8	14 0	14 0	11 5	14 2	14 0	11 5	11 5	14 2
Stability	1000 Min	1000 Min	2260	2172	2385	2172	2192	2385	1763	1753	1804	1763	1753	1753	1804
Blows	50	50	75	75	50	75	50	50	50	50	50	50	50	50	50

* In error ACB was placed instead of BCBC
W = Wedge

TABLE 23
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Bituminous Concrete Plant Reports
Bituminous Concrete Base Course (BCBC)

Sieve Size	Job Mix Tolerance SPS-1 (SHRP)	DE DOT Normal BCBC Mix	Test Sections - Plant Reports, Production Dates & Layer Thickness as Per Plan											
			100110		100159			100106			100104			
			Aug. 10 4"	Aug. 15 W 1-2"	July 17 3"	July 19 W 1-2"	July 19 3"	July 17 4"	July 19 W 1-2"	July 19 4"	June 20 4"	July 17 4"	July 19 W 1-2"	July 19 4"
1-1/2	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1	95-100													
3/4	50-90	75-100	86 9	91 6	90 6	92 6	92 6	90 6	92 6	92 6	88 0	90 6	92 6	92 6
1/2														
3/8		48-80	59 2	67 9	64 0	66 6	66 6	64.0	66 6	66 6	69 4	64 0	66 6	66 6
#4	20-50													
#8		20-48	29 7	35 8	28 0	30 7	30 7	28 0	30 7	30 7	29.7	28 0	30 7	30 7
#10	15-40													
#30	15-40	10-30	16 6	18 3	15 8	16 5	16 5	15 8	16 5	16 5	15.1	15 8	16 5	16 5
#50		7-25	6 6	8.4	8 0	8 3	8 3	8 0	8 3	8 3	6 8	8 0	8 3	8 3
#200	0-10	3-10	2 0	3 7	2 2	2 4	2 4	2 2	2.4	2 4	1 9	2 2	2 4	2 4
% AC	3 5-5 5	3-4 5	4 63	4 69	4 28	4 58	4 58	4 28	4 58	4 58	4 3	42 8	4 58	4 58
Marshall Properties														
S G. (Rice)			2.605	2 592	2 571	2.606	2 606	2 571	2 606	2.606	2.589	2 571	2 606	2 606
Unit Wt.			156 2	154 8	154 2	156 0	156.0	154 2	156 0	156 0	155 5	154 2	156 0	156 0
B S.G			2 503	2 480	2 472	2 500	2 500	2 472	2 500	2 500	2 491	2 472	2 500	2 500
% Air Voids	3-5	3-8	3 9	4 20	3 8	4 1	4 1	3 8	4 1	4 1	3 9	3 8	4 1	4 1
% VMA			14 4	14 5	14 2	14 5	14 5	14 2	14 5	14 5	14 3	14 2	14 5	14 5
% VFAC			72 7	71 4	72 9	71 8	71 8	72 9	71 8	71 8	72 5	72 9	71 8	71 8
Flow	8-20	8-18	14 0	11 5	12 0	11 5	11.5	12.0	11 5	11 5	11 8	12 0	11 5	11 5
Stability	1000 Min	1000 Min	1763	1753	2021	2007	2007	2021	2007	2007	2105	2021	2007	2007
Blows	50	50	50	50	50	50	50	50	50	50	50	50	50	50

TABLE 24
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Bituminous Concrete Plant Reports
Bituminous Concrete Binder Course (ACB)

Sieve Size	DE DOT Normal SM Tolerance	SPS-1 JMF	Test Sections - Plant Reports, Production Dates & Layer Thickness (ins.)													
			100160			100107		100105		100102	100101		100103	100111	100112	
			June 15* 2"	Aug. 19 2.75"	Sept. 14 W 1-2"	Aug. 19 2.75"	Sept. 14 W 1"	Aug. 22 2.75"	Sept. 14 W 1"	Aug. 22 2.75"	July 17* 3"	Sept. 11 2.75"	Sept. 11 2.75"	Sept. 11 2.75"	Sept. 8* W 1-2"	Sept. 11 2.75"
1-1/4	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1	95-100	99	99 7	97 0	98 4	97 0	98 4	98 1	98 4	98 1	98 8	98 5	98 5	98 5	100	98 5
3/4	75-95	88	86 2	89 3	92 2	89 3	92 2	88 3	92 2	88 3	89 8	90 9	90 9	90 9	89 6	90 9
1/2	50-80	73	71 6	72 3	72 8	72 3	72 8	69 2	72 8	69 2	75 2	75 3	75 3	75 3		75 3
3/8	45-70	62	63 6	62 9	61 9	62 9	61 9	62 7	61 9	62 7	66 3	63 4	63 4	63 4	61 2	63 4
#4	30-50	43	44 7	41 9	42 4	41 9	42 4	42 5	42 4	42 5	48 4	44 2	44 2	44 2		44 2
#8	22-38	34	29 5	29 0	31 3	29 0	31 3	29 5	31 3	29 5	32 5	32 9	32 9	32 9	28 3	32 9
#30	9-23	15	15 1	15 4	17 3	15 4	17 3	14 3	17 3	14 3	17 9	19 3	19 3	19 3	15 5	19 3
#50	6-18	9	7 1	6 2	7 9	6 2	7 9	6 8	7 9	6 8	8 6	10 1	10 1	10 1	7 1	10 1
#200	3-10	5	1 9	1 8	2 5	1 8	2 5	1 9	2 5	1 9	2 1	4 0	4 0	4 0	2 1	4 0
% AC	3 5-5 5	3 9	3 72	3 69	3 85	3 69	3 85	3 80	3 85	3 80	3 62	3 99	3 99	3 99	4 13	3 99
Marshall Properties																
S G (Rice)			2 592	2 623	2 590	2 623	2 590	2 622	2 590	2 622	2 592	2 608	2 608	2 609	258 4	2 609
Unit Wt			154 1	155 1	155 0	155 1	155 0	157 3	155 0	157 3	154 9	156 0	156 0	156 0	155 8	156 0
B S G			2 485	2 485	2 484	2 485	2 484	2 521	2 484	2 521	2 482	2 501	2 501	2 501	2 497	2 501
% Air Voids	3-6	3-5	4 9	5 3	4 1	5 3	4 1	3 8	4 1	3 8	4 3	4 1	4 1	4 1	3 4	4 1
% VMA	13 Min	13 Min	15 2	14 7	13 5	14 7	13 5	13 4	13 5	13 4	13 7	13 9	13 9	13 9	13 8	13 9
% VFAC			68 1	64 2	69 5	64 2	69 5	71 3	69 5	71 3	68 8	69 8	69 8	69 8	74 4	69 8
Flow	8-20	8-14	12 8	12 6	11 1	12 6	11 1	13 0	11 1	13 0	12	11 3	11 3	11 3	14 3	11 3
Stability	1000 Min	1800 Min	2192	2123	2254	2123	2254	2376	2254	2376	2473	2169	2169	2169	1836	2169
Blows	75	75	50	75	75	75	75	75	75	75	50	75	75	75	50	75

TABLE 24 (Cont.)
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Bituminous Concrete Plant Reports
Bituminous Concrete Binder Course (ACB)

Sieve Size	DE DOT Normal SM Tolerance	SPS-1 JMF	Test Sections - Plant Reports, Production Dates & Layer Thickness (ins.)													
			100110		100108			100109			100159		100106		100104	
			Aug. 19 3"	Sept. 11 2.75"	Aug. 19 3"	Sept. 8* W 1-2"	Sept. 11 2.75"	Aug. 19 3"	Sept. 8* W 1-2"	Sept. 9 2.75"	July 20 2"	Sept. 9 2.75"	July 20 3"	Sept. 9 2.75"	July 20 3"	Sept. 9 2.75"
1-1/4	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1	95-100	99	97 0	98 5	97 0	100	98 5	97 0	100	98 9	98 5	98 9	98 5	98 9	98 5	98 9
3/4	75-95	88	89 3	90 9	89 3	89 6	90 9	89 3	89 6	92 0	88 8	92 0	88 8	92 0	88 8	92 0
1/2	50-80	73	72 3	75 3	72 3		75 3	72 3		82 0	72 2	82 0	72 2	82 0	72 2	82 0
3/8	45-70	62	62 9	63 4	62 9	61 2	63 4	62 9	61 2	73 1	63 0	73 1	63 0	73 1	63 0	73 1
#4	30-50	43	41 9	44 2	41 9		44 2	41 9		54 1	43 4	54 1	43 4	54 1	43 4	54 1
#8	22-38	34	29 0	32 9	29 0	28 3	32 9	29 0	28 3	38 5	29 9	38 5	29 9	38 5	29 9	38 5
#30	9-23	15	15 4	19 3	15 4	15 5	19 3	15 4	15 5	21 3	15 8	2 13	15 8	21 3	15 8	21 3
#50	6-18	9	6 2	10 1	6 2	7 1	10 1	6 2	7 1	8 3	8 0	8 3	8 0	8 3	8 0	8 3
#200	3-10	5	1 8	4 0	1 8	2 1	4 0	1 8	2 1	2 7	2 5	2 7	2 5	2 7	2 5	2 7
% AC	3 5-5 5	3 9	3 69	3 99	3 69	4 13	3 99	3 69	4 13	3 82	3 99	3 82	3 99	3 82	3 99	3 82
Marshall Properties																
S G (Rice)			2 673	2 609	2 623	2 584	2 609	2 623	2 584	2 600	2 610	2 600	2 610	2 600	2 610	2 600
Unit Wt			155 1	156 0	155 1	155 8	156 0	155 1	155 8	156 3	156 2	156 3	156 2	156 3	156 2	156 3
B S G			2 485	2 501	2 485	2 497	2 501	2 485	2 497	250 5	2 502	2 505	2 502	2 505	2 502	2 505
% Air Voids	3-6	3-5	5 3	4 1	5 3	3 4	4 1	5 3	3 4	4 0	4 1	4 0	4 1	4 0	4 1	4 0
% VMA	13 Min	13 Min	14 7	13 9	14 7	13 8	13 9	14 7	13 8	13 5	13 6	13 5	13 6	13 5	13 6	13 5
% VFAC			64 2	69 8	64 2	74 4	69 8	64 2	74 4	70 3	69 6	70 3	69 6	70 3	69 6	70 3
Flow	8-20	8-14	12 6	11 3	12 6	14 3	11 3	12 6	14 3	11 3	10 7	11 3	10 7	11 3	10 7	11 3
Stability	1000 Min	1800 Min	2123	2169	2123	1836	2169	2123	1836	2226	2363	2226	2363	2226	2363	2226
Blows	75	75	75	75	75	50	75	75	50	75	75	75	75	75	75	75

* BCBC was placed instead of ACB

TABLE 25
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Bituminous Concrete Plant Reports
PATB and Bituminous Concrete Surface Course (ACC)

PATB			Bituminous Concrete Surface Course (ACC)			
Sieve Size	JMF % Passing	Plant Reports 100107,108, 110, 111, 112 Placed Aug. 9, 17, 18, 1995 T = 4"	Sieve Size	JM Tolerance % Passing	All 14 Test Sections (SHRP Lane) were placed Sept. 16, 1995 Plant Reports & Marshall Properties T = 1.25" (2 Samples)	
		(Average)	1/2	100	100	100
1-1/2	100	100	3/8	85-100	96 7	95 6
1	95-100	97.2	#4	50-75	64 9	62.4
1/2	25-60	34.7	#8	33-59	44.3	40.7
#4	0-10	0.8	#30	14-32	24.8	22.5
#8	0-5	0.7	#50	7-26	14.5	13.0
#200	0-2	0.5	#200	3-10	5.6	5.9
% AC	2-2.5	2.2	% AC	3-5	5.2	5.0

Marshall Properties

		5 Samples - each sample average of 3				
	JMF	1	2	3	4	5
S.G. (Rice)		2.559	2.549	2.570	2.550	2 571
Unit Wt.		155.7	155.1	154.5	155.1	155 9
B.S.G.		2.495	2.486	2.476	2.486	2.497
% Air Voids	3-5	2.5	2.5	3.7	2.5	2.8
% VMA	16 Min.	15.3	15.3	16 4	15.1	15.2
% VFAC		83 7	83.9	77.6	83.4	81.4
Flow	8-14	10.2	10.5	10.2	10.2	9.7
Stability	1800 Min.	2937	2857	2683	2843	2833
Blows	75	75	75	75	75	75

TABLE 26
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Bituminous Pavement Layer Thicknesses - 4" Cores

Test Section	Sample Location	Const. Sta.	SHRP Sta.	Offset	Design Thickness - ins.					Actual Thickness - ins.					Remarks
					PATB	BCBC	ACB	ACC	Total	PATB	BCBC	ACB	ACC	Total	
100160	C1	429+75	0-25	6		6	4 75	1 25	12		5-3/4	6-3/16	1-5/16	13-1/4	Placed wedge on
	C2	429+75	0-25	3							5-3/4	6-1/8	1-5/16	13-3/16	top of 2nd lift of ACB
	C3	424+25	5+25	6							7-1/4	4-7/16	1-1/4	12-15/16	
	C4	424+25	5+25	3							7-1/8	4-9/16	1-3/16	12-7/8	
														T = 52-1/4	Avg = 13 06"
100107	C5	422+75	0-25	7 5	4		2 75	1 25	8	4-1/8		4-5/16	1	9-7/16	Placed wedge on
	C6	422+75	0-25	6						4-3/16		3-7/8	1-1/8	9-3/16	ACB lift
	C7	422+75	0-25	4 5						4		3-3/4	1-1/8	8-7/8	
	C8	422+75	0-25	3						4-1/8		3-1/4	1-3/16	8-11/16	
	C9	417+25	5+25	6						4-1/4		3-1/8	1-3/8	8-3/4	
	C10	417+25	5+25	3						4-3/8		3	1-1/4	8-5/8	
														T = 53-9/16	Avg = 8 92"
100105	C11	415+75	0-25	7 5		4	2 75	1 25	8		3-7/8	2-7/16	1-3/16	7-1/2	Placed wedge on
	C12	415+75	0-25	6							3-5/8	2-9/16	1-3/16	7-3/8	ACB lift
	C13	415+75	0-25	4 5							3-3/4	2-1/2	1-1/4	7-1/2	
	C14	415+75	0-25	3							3-9/16	2-1/2	1-3/16	7-1/4	
	C15	410+25	5+25	6							4-1/8	3-1/2	1-1/4	8-7/8	
	C16	410+25	5+25	3							4-3/8	3-1/8	1-3/8	8-7/8	
														T = 47-3/8	Avg = 7 89"
100102	C17	408+75	0-25	6			2 75	1 25	4			2-11/16	1-3/16	3-7/8	
	C18	408+75	0-25	3								2-5/8	1-1/4	3-7/8	
	C19	403+25	5+25	6								2-7/8	1-5/16	4-3/16	
	C20	403+25	5+25	3								2-3/16	1-5/16	3-1/2	
														T = 15-3/4	Avg = 3 94"

TABLE 26 (Cont.)
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Bituminous Pavement Layer Thicknesses - 4" Cores

Test Section	Sample Location	Const. Sta.	SHRP Sta.	Offset	Design Thickness - ins.					Actual Thickness - ins.					Remarks
					PATB	BCBC	ACB	ACC	Total	PATB	BCBC	ACB	ACC	Total	
100101	C21	401+75	0-25	7 5			5 75	1 25	7			5-11/16	1-5/16	7	
	C22	401+75	0-25	6								5-5/8	1-3/8	7	
	C23	401+75	0-25	4 5								5-3/4	1-3/8	7-1/8	
	C24	401+75	0-25	3								5-13/16	1-1/4	7-1/16	
	C25	396+25	5+25	6								6-1/4	1-1/4	7-1/2	
	C26	396+25	5+25	3								5-1/4	1-1/8	7-3/8	
														T = 43.0	Avg = 7.16"
100103	C27	391+75	0-25	6		8	2 75	1 25	12		7-1/2	3-1/8	1-1/4	11-7/8	
	C28	391+75	0-25	3							8-1/4	2-1/2	1-1/8	11-7/8	
	C29	386+25	5+25	6							8-15/16	2-9/16	1-1/4	12-3/4	
	C30	386+25	5+25	3							9-1/16	2-1/2	1-13/16	12-3/8	
														T = 49-3/8	Avg = 12 34"
100111	C31	384+75	0-25	6	4	8	2 75	1 25	16	3-1/2	9-1/4	2-5/8	1-1/8	16-1/2	Wedge between 2
	C32	384+75	0-25	3						3-1/4	9-1/2	2-1/2	1-1/4	16-1/2	BCBC layers
	C33	379+25	5+25	6						4-1/4	9-1/4	2-3/8	1-1/4	17-1/8	Core split @ 3-5/8"
	C34	379+25	5+25	3						3-7/8	9-7/8	2-5/8	1-1/4	17-5/8	
														T = 67-1/4	Avg = 16 81"
100112	C35	377+75	0-25	7 5	4	12	2 75	1 25	20	NR	10-3/8	3-5/8	1-3/8	(15-3/8)	Wedge between
	C36	377+75	0-25	6						NR	12-5/8	3	1-3/8	(17)	BCBC lifts also
	C37	377+75	0-25	4 5						NR	12-13/16	3-1/16	1-3/8	(17-1/4)	Wedge over top of
	C38	377+75	0-25	3						NR	12-7/8	3	1-3/8	(17-1/4)	BCBC lift
	C39	372+25	5+50	6						NR	12-7/16	3	1-5/16	(16-3/4)	
	C40	372+25	5+50	3						NR	12-1/8	3-1/4	1-1/4	(16-5/8)	
														T = 100-3/8	Avg = 16.72"

NR = Not Recovered
( ) w/o PATB depths

TABLE 26 (Cont.)
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Bituminous Pavement Layer Thicknesses - 4" Cores

Test Section	Sample Location	Const. Sta.	SHRP Sta.	Offset	Design Thickness - ins.					Actual Thickness - ins.					Remarks
					PATB	BCBC	ACB	ACC	Total	PATB	BCBC	ACB	ACC	Total	
100110	C41	370+75	0-25	6	4	4	5 75	1 25	15	3	5-3/8	5-1/8	1-3/8	14-7/8	
	C42	370+75	0-25	3						NR	5-1/4	5-1/8	1-1/4	(11-5/8)	Break @ 3-3/4" - no bond
	C43	365+25	5+25	6						3-1/8	4-1/2	6-1/8	1-1/4	15	Wedge of BCBC
	C44	365+25	5+25	3						3-1/8	6	4-7/8	1-1/4	15-1/4	on top of BCBC
														T = 4-5/8	Avg = 15 04"
100108	C45	363+75	0-25	7 5	4		5 75	1 25	10	3-5/8		5-3/4	1-3/8	10-3/4	Wedge of ACB
	C46	363+75	0-25	6						3-3/4		5-3/4	1-3/8	10-7/8	between 2 lifts
	C47	363+75	0-25	4 5						3-5/8		5-7/8	1-1/4	10-3/4	of ACB
	C48	363+75	0-25	3						3-1/2		5-7/8	1-1/4	10-1/2	
	C49	358+25	5+25	6						3-3/4		6-1/8	1-3/8	11-1/4	
	C50	358+25	5+25	3						3-5/8		6	1-3/8	11	
														T = 65-3/8	Avg = 10 89"
100109	C51	365+75	0-25	6	4		5 75	1 25	11	3-1/2		6-1/8	1-1/4	11-1/4	Wedge between 2
	C52	365+75	0-25	3						4-1/2		6	1-3/16	11-1/2	lifts of ACB
	C53	351+25	5+25	6						4		6-3/8	1-1/4	11-5/8	Break @ 4-1/4" - no bond
	C54	351+25	5+25	3						4		6-3/8	1-1/8	11-1/2	
														T = 45-1/8	Avg = 11 28"
100159	C55	349+75	0-25	6		6	4 75	1 25	12		6-3/8	5-5/8	1-3/8	12-3/8	No bond - 4" - 8-3/4"
	C56	349+75	0-25	3							6-5/8	4-5/8	1-1/4	12-1/2	No bond - 3-1/4"
	C57	344+25	5+25	6							6-1/4	5-1/4	1-3/8	12-7/8	No bond - 3-5/8"
	C58	344+25	5+25	3							7-1/4	4-1/8	1-1/8	12-1/2	No bond - 3-9/16"
														T = 50-1/8	Avg = 12 53"
															Wedge between 2 BCBC lifts

TABLE 26 (Cont.)
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Bituminous Pavement Layer Thicknesses - 4" Cores

Test Section	Sample Location	Const. Sta.	SHRP Sta.	Offset	Design Thickness - ins.					Actual Thickness - ins.					Remarks
					PATB	BCBC	ACB	ACC	Total	PATB	BCBC	ACB	ACC	Total	
100106	C59	342+75	0-25	7 5		8	5 75	1 25	15		8-1/2	6-1/4	1-3/8	16-1/8	No bond - 4 "
	C60	342+75	0-25	6							9-1/4	5-1/8	1-3/8	15-3/4	No bond - 4"
	C61	342+75	0-25	4 5							8-1/8	6-3/16	1-5/16	15-5/8	No bond - 4"
	C62	342+75	0-25	3							7-7/8	7-1/4	1-1/8	15-1/4	No bond - 4"
	C63	337+25	5+25	6							8-1/4	6-1/8	1-1/4	15-5/8	No bond - 3-7/8
	C64	337+25	5+25	3							7-7/8	5-7/8	1-1/4	15	No bond - 4-1/2
														T = 93-1/4	Avg = 15 54
															Wedge between 2 lifts of BCBC
100104	C65	336+50	0-25	6		12	5 75	1 25	19		12-1/2	5-3/4	1-3/8	19-5/8	No bond - 4"
	C66	336+50	0-25	3							12-1/8	5-15/16	1-3/16	19-1/4	No bond - 4-1/8
	C67	331+00	5+25	6							11-1/4	4-3/8	1-1/8	18	No bond - 4"
	C68	331+00	5+25	3							10-1/8	5-11/16	1-3/16	17	No bond - 4"
														T = 73-3/8	Avg. = 18 46
															Wedge between 2nd and 3rd lift of BCBC

TABLE 27
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Layer Thickness (ins.) - 5 Point Levels

Test Section	GABC/DGAB		CASB		PATB		BCBC		ACB	ACC	ACB & ACC		OG		Total	
	Design	5 Pt. Avg.	Design	5 Pt. Avg.	Design	5 Pt. Avg.	Design	5 Pt. Avg.	Design	Design	Design Total	5 Pt. Avg.	Design	5 Pt. Avg.	Design *	5 Pt. Avg.
100160			6	5 5			6	5 6	4 75	1 25	6	7 20	1		18	18 3
100107	4	4 0			4	3 7			2 75	1 25	4	4 8	1		12	12 5
100105	4	3 4					4	4 3	2 75	1 25	4	4 4	1		12	12 1
100102	12	11.8							2 75	1 25	4	4 1	1		16	15 9
100101	8	8 1							5 75	1 25	7	6 9	1		15	15 0
100103							8	8 0	2 75	1 25	4	4 8	1		12	12 8
100111					4	4 0	8	8 6	2 75	1 25	4	3.6	1		16	16 2
100112					4	3 4	12	12 4	2 75	1 25	4	4 4	1		20	20 2
100110					4	3 6	4	4 1	5 75	1 25	7	7.3	1		15	15 0
100108	8	7 3			4	3 7			5.75	1 25	7	7.0	1		19	18 0
100109	12	12 1			4	4 2			5 75	1 25	7	7 3	1		23	23 6
100159	8	7 7					6	6 5	4 75	1 25	6	5 6	1		20	19 8
100106	4	3 8					8	8.5	5 75	1 25	7	6.8	1		19	19 1
100104							12	12 0	5 75	1 25	7	6.7	1		19	18 7

* The 1" OG thickness is not included and not placed in 1995

TABLE 28
DE DOT SPS-1 PROJECT 100100 - US 113 SB, ELLENDALE, DE
Comparison of Bituminous Thicknesses
4" Cores, 5 Point Levels and Design

Test Section	4" Cores (ins.)	5 Point Levels - (ins.)	Design (ins.)	Remarks
100160	13.06	12.84	12	Design Thickness does not include 1" OG
100107	8.92	8.50	8	
100105	7.89	8.7	8	
100102	3.94	4.08	4	
100101	7.16	6.84	7	
100103	12.31	12.84	12	
100111	16.81	16.20	16	
100112	16.72	16.80	16	Without PATB
100110	15.04	15.0	15	
100108	10.89	10.73	11	
100109	11.28	11.48	11	
100159	12.53	12.12	12	
100106	15.54	14.36	15	
100104	18.46	18.7	19	

SHRP–LTPP DELAWARE TEST SITE LOCATIONS
GPS–SPS PAVEMENT STUDIES

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PMS PAVEMENT MANAGEMENT SYSTEMS LIMITED

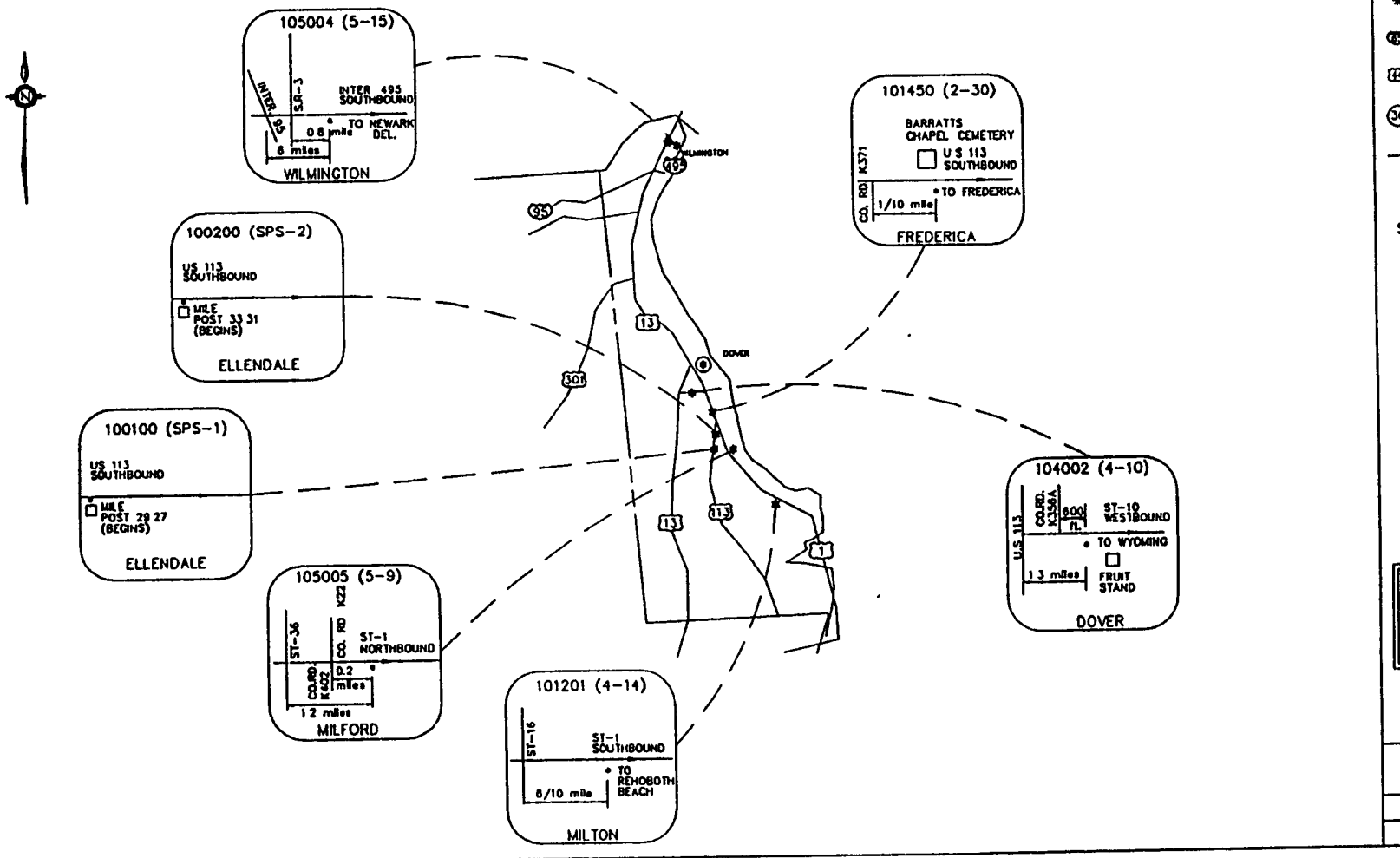
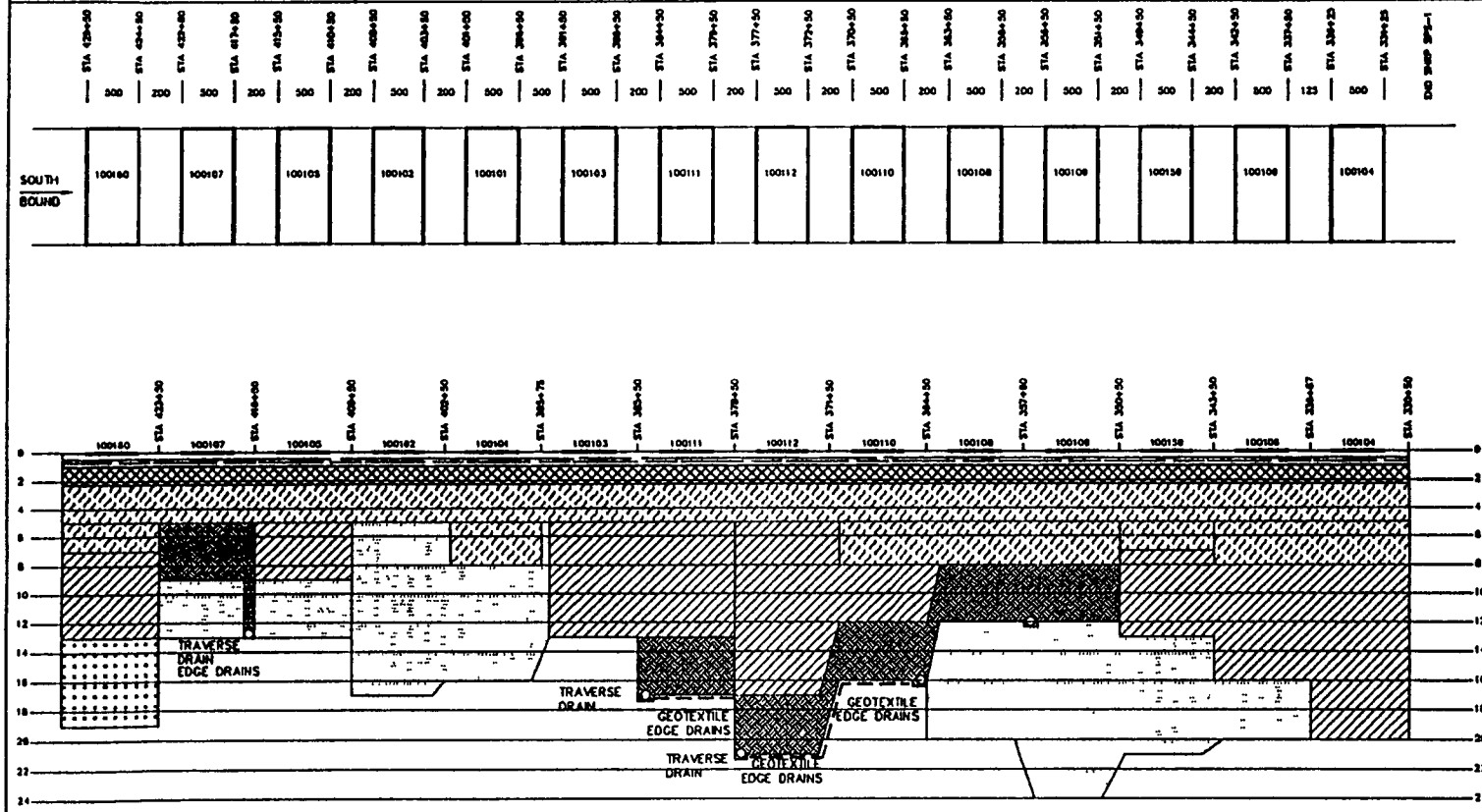


Figure 1

FHWA–LTPP SPS–1 DELAWARE DESIGN SCHEMATIC
STRUCTURE FACTORS FOR FLEXIBLE PAVEMENTS

shrp

PMS PAVEMENT MANAGEMENT SYSTEMS LIMITED



LEGEND

- OG– OPEN GRADED FRICTION COURSE (J)
- AC–C – HOT MIX SURFACE COURSE (H)
- AC–B – HOT MIX BINDER COURSE (G)
- BCBC – BITUMINOUS BASE COURSE (F)
- PATB – PERMEABLE ASPHALT TREATED BASE (E)
- CASB – COAL ASH STABILIZED BASE COURSE (D)
- GABC – DENSE GRADED AGGREGATE BASE COURSE, TYPE B (C)
- EMB – EMBANKMENT FILL APPROX. 12" (B)
- SS – NATURAL SUBGRADE SOIL (A)

SPS–1
US 113 DUALIZATION, SBL
ELLENDALE, DE.

PLOTDATE: MAR 24/95

SHRP SPS–1 TEST SECTIONS ONLY
DRAWING NOT INTENDED TO BE USED FOR CONSTRUCTION PURPOSES

SPS–1–1AE

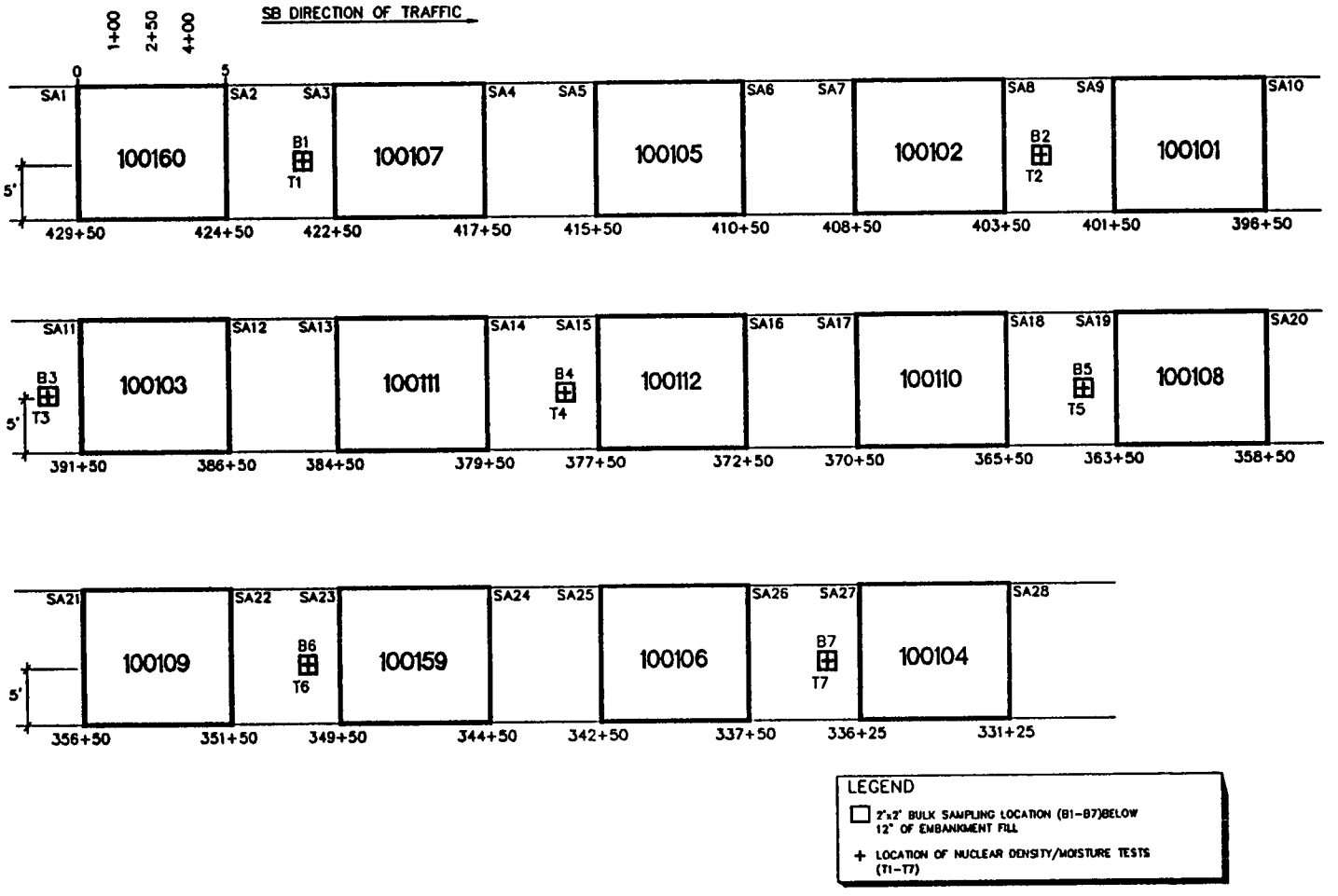
STRATEGIC HIGHWAY RESEARCH PROGRAM NORTH ATLANTIC REGION

Figure 2

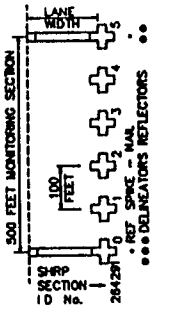
shrp

FHWA–LTPP SPS–1 DELAWARE SAMPLING PLAN
STRUCTURAL FACTORS FOR FLEXIBLE PAVEMENTS

PMS PAVEMENT MANAGEMENT SYSTEMS LIMITED



TYPICAL SITE SIGNING & MARKING



SPS–1
US 113 DUALIZATION, SBL
ELLENDALE, DE

PLOTDATE: MAR 23/95 | FHWA SPS–1 TEST SECTIONS ONLY DIMENSIONAL DETAILS ONLY DRAWING NOT TO SCALE

SPS–1–1E

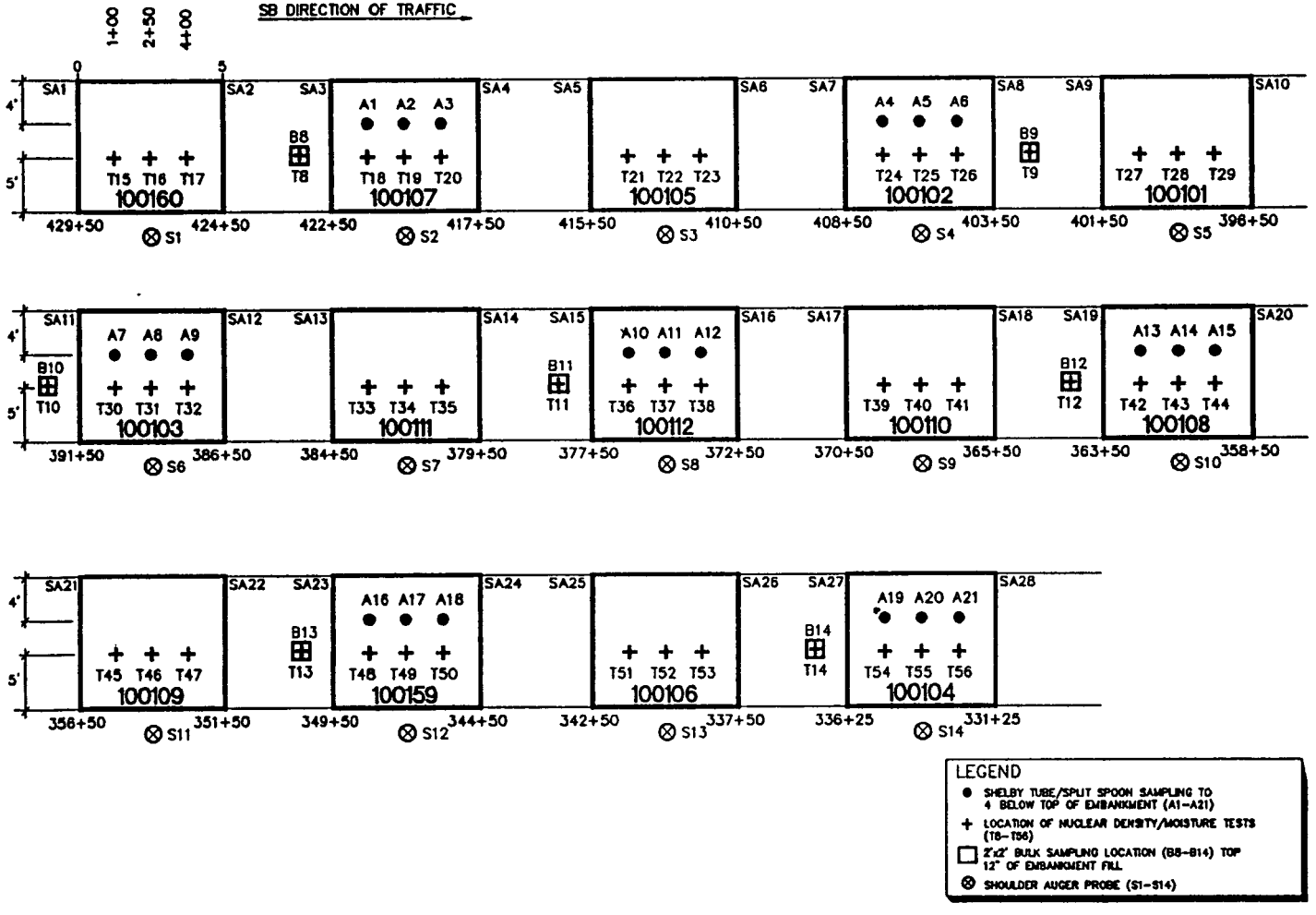
FIELD MATERIALS SAMPLING AND TESTING - SUBGRADE, LAYER 1

Figure 3

FHWA–LTPP SPS–1 DELAWARE SAMPLING PLAN
STRUCTURAL FACTORS FOR FLEXIBLE PAVEMENTS

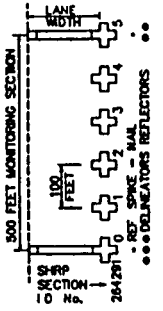
shrp

PMS PAVEMENT MANAGEMENT SYSTEMS LIMITED



LEGEND
- ● SHELBY TUBE/SPLIT SPOON SAMPLING TO 4 BELOW TOP OF EMBANKMENT (A1–A21)
- \+ LOCATION OF NUCLEAR DENSITY/MOISTURE TESTS (T8–T56)
- □ 2'x2' BULK SAMPLING LOCATION (B8–B14) TOP 12" OF EMBANKMENT FILL
- ⊗ SHOULDER AUGER PROBE (S1–S14)

TYPICAL SITE SIGNING & MARKING



SPS–1
US 113 DUALIZATION, SBL
ELLENDALE, DE.

PLOTDATE: MAR 23/98	FHWA SPS–1 TEST SECTIONS ONLY DIMENSIONAL DETAILS ONLY DRAWING NOT TO SCALE
SPS–1–5E	

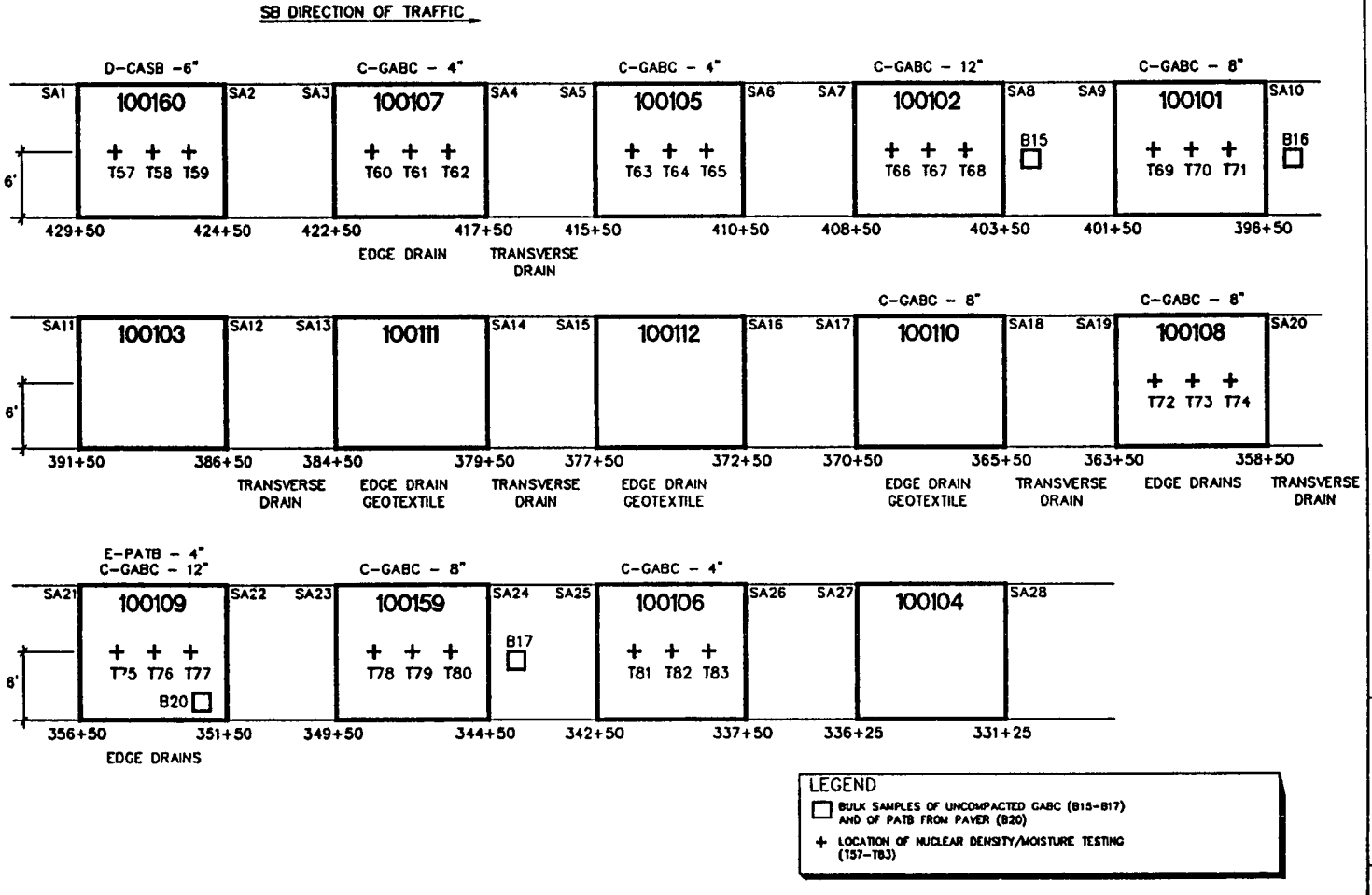
FIELD MATERIALS SAMPLING AND TESTING - EMBANKMENT FILL, LAYER 2

Figure 4

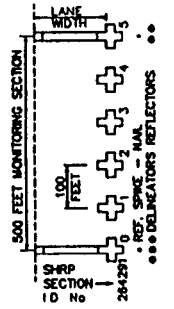
SPS-1-5E

FHWA–LTPP SPS–1 DELAWARE SAMPLING PLAN
STRUCTURAL FACTORS FOR FLEXIBLE PAVEMENTS

PAVEMENT MANAGEMENT SYSTEMS LIMITED



TYPICAL SITE SIGNING & MARKING



SPS–1
US 113 DUALIZATION, SBL
ELLENDALE, DE.

PLOTDATE: MAR 23/98

SPS–1–2E

FHWA SPS–1 TEST SECTIONS ONLY
DIMENSIONAL DETAILS ONLY
DRAWING NOT TO SCALE

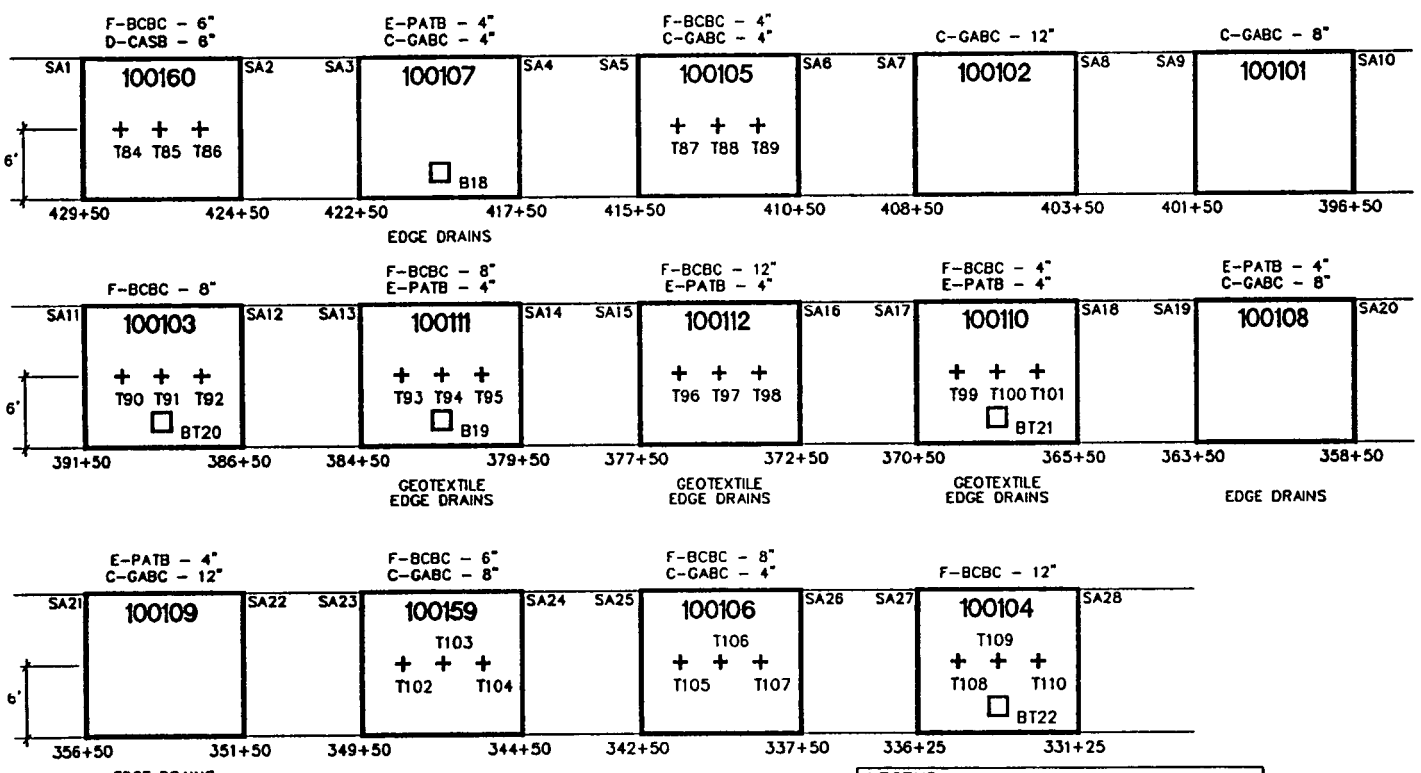
FIELD MATERIALS SAMPLING AND TESTING - DENSE GRADED AGGREGATE BASE, LAYER 3 and PERMEABLE ASPHALT TREATED BASE, LAYER 4

Figure 5

FHWA–LTPP SPS–1 DELAWARE SAMPLING PLAN
STRUCTURAL FACTORS FOR FLEXIBLE PAVEMENTS

PAVEMENT MANAGEMENT SYSTEMS LIMITED

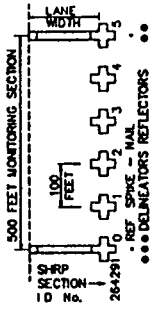
SB DIRECTION OF TRAFFIC →



LEGEND

- ☐ BULK SAMPLES OF BCBC FROM PAVER (BT20–BT22) AND OF PATB FROM PAVER (B18 B19) AND OF AC FROM TANKER (B21–B23)
- \+ LOCATION OF NUCLEAR DENSITY TESTING (T84–T110)

TYPICAL SITE SIGNING & MARKING



ROAD TEST

FIELD MATERIALS SAMPLING AND TESTING - BITUMINOUS BASE COURSE, LAYER 3/4 and PERMEABLE ASPHALT TREATED BASE, LAYER 3/4

SPS-1
US 113 DUALIZATION, SBL
ELLENDALE, DE.

PLOTDATE: MAR 23/98 | SPS-1-3E

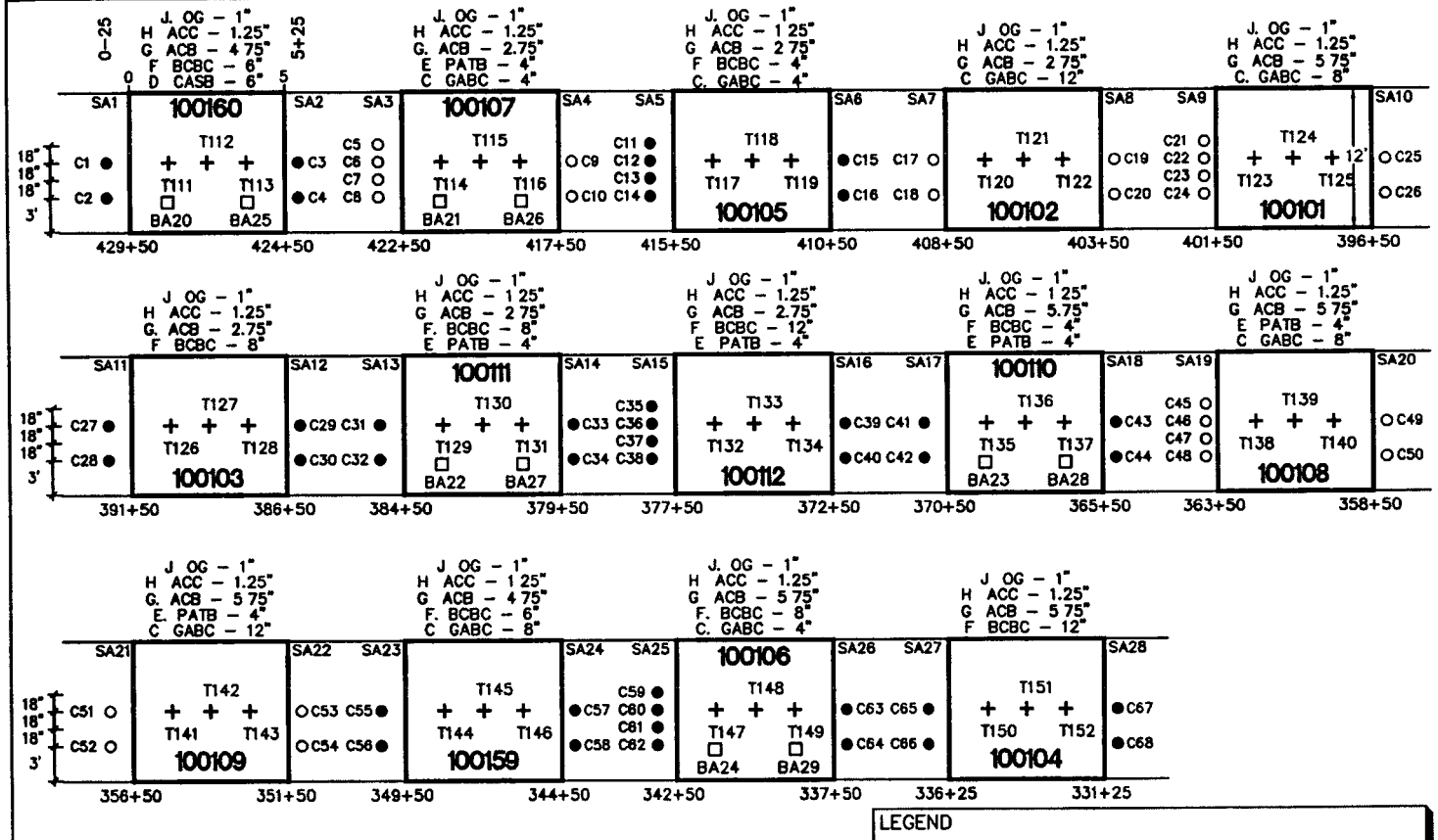
FHWA SPS-1 TEST SECTIONS ONLY
DIMENSIONAL DETAILS ONLY
DRAWING NOT TO SCALE

Figure 6

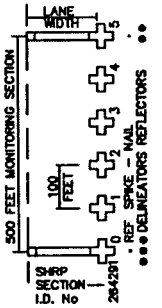
SPS-1-3E

FHWA–LTPP SPS–1 DELAWARE SAMPLING PLAN
STRUCTURAL FACTORS FOR FLEXIBLE PAVEMENTS

PAVEMENT MANAGEMENT SYSTEMS LIMITED



TYPICAL SITE SIGNING & MARKING



ROAD TEST

SPS–1
US 113 DUALIZATION, SBL
ELLENDALE, DE.

FLORIDA: MAR 24/95 | SPS–1–SE | FHWA SPS–1 TEST SECTIONS ONLY DIMENSIONAL DETAILS ONLY DRAWING NOT TO SCALE

FIELD MATERIALS SAMPLING AND TESTING - ASPHALT CONCRETE SURFACE - LAYER 6

Figure 7

FHWA–LTPP SPS–1 DELAWARE SAMPLING PLAN
STRUCTURAL FACTORS FOR FLEXIBLE PAVEMENTS

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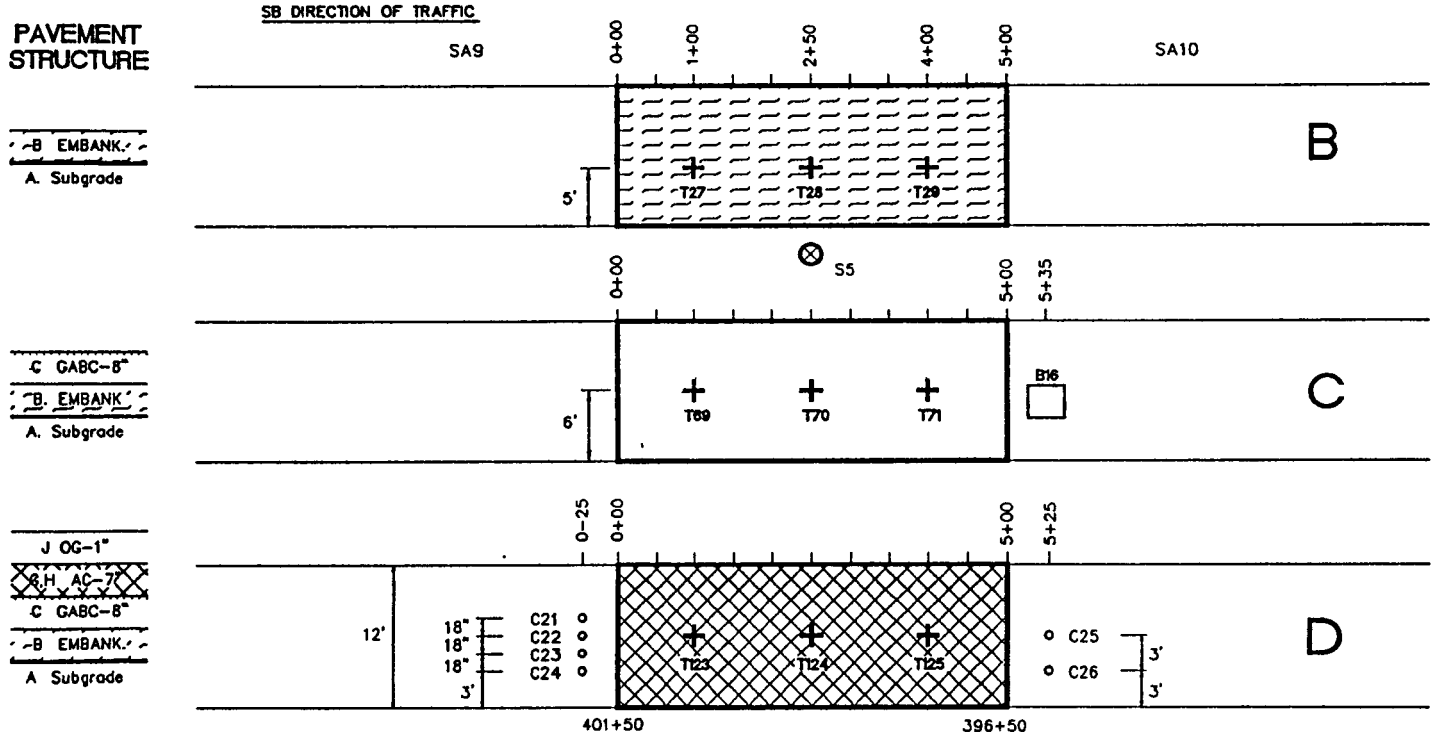
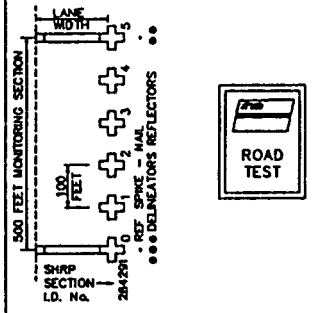
PMS PAVEMENT MANAGEMENT SYSTEMS LIMITED



TYPICAL SITE SIGNING & MARKING



A

B + NUCLEAR DENSITY/MOISTURE TESTING (T22–T24)

⊗ SHOULDER PROBE (S9)

C + NUCLEAR DENSITY/MOISTURE TESTING (T55–T57)

□ BULK SAMPLE OF UNCOMPACTED GABC (B16)

D ○ 4" O.D. CORES OF AC SURFACE ONLY (C21–C26)

+ NUCLEAR DENSITY TESTING (T123–T125)

SAMPLING AND TESTING PLAN FOR SECTION 100101

SPS–1
US 113 DUALIZATION, SBL
ELLENDALE, DE.

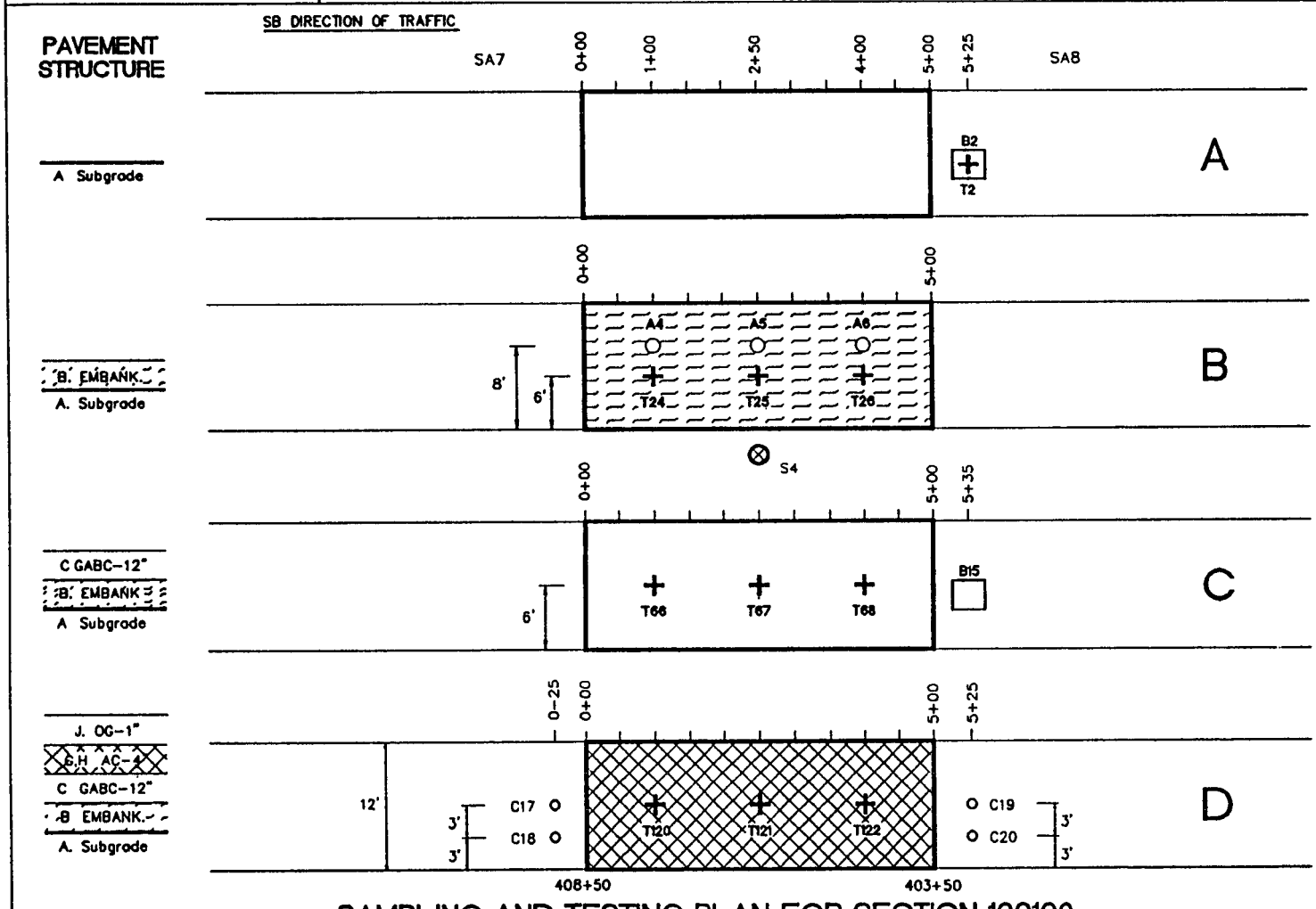
PLOTDATE: MAR 22/96

FHWA SPS–1 TEST SECTIONS ONLY
DIMENSIONAL DETAILS ONLY
DRAWING NOT TO SCALE

Figure 8

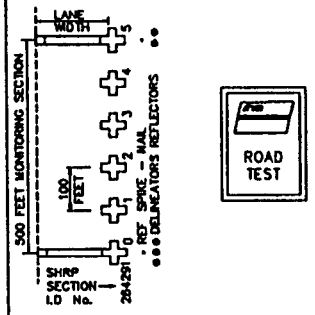
FHWA–LTPP SPS–1 DELAWARE SAMPLING PLAN
STRUCTURAL FACTORS FOR FLEXIBLE PAVEMENTS

PAVEMENT MANAGEMENT SYSTEMS LIMITED



SAMPLING AND TESTING PLAN FOR SECTION 100102

TYPICAL SITE SIGNING & MARKING



A + NUCLEAR DENSITY/MOISTURE TESTING (T2)
□ BULK SAMPLE OF SUBGRADE (B2)

B ○ THIN WALL TUBE SAMPLES (A4–A6)
+ NUCLEAR DENSITY/MOISTURE TESTING (T24–T26)
⊗ SHOULDER PROBE (S4)

C + NUCLEAR DENSITY/MOISTURE TESTING (T66–T68)
□ BULK SAMPLE OF UNCOMPACTED GABC (B15)

D ○ 4" O.D CORES OF AC SURFACE ONLY (C17–C20)
+ NUCLEAR DENSITY TESTING (T120–T122)

SPS–1
US 113 DUALIZATION, SBL
ELLENDALE, DE.

PLOTDATE: MAR 23/98

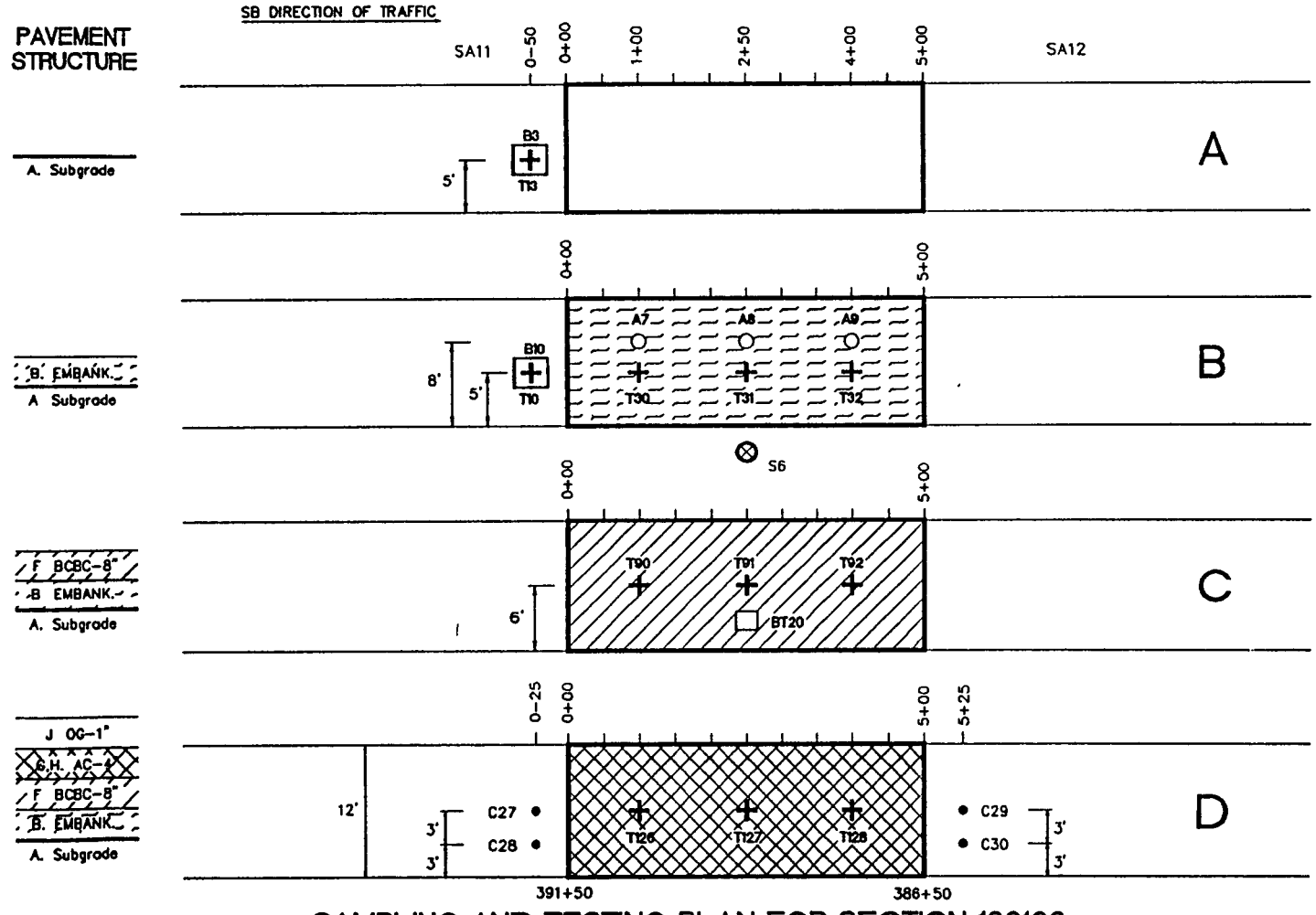
FHWA SPS–1 TEST SECTIONS ONLY
DIMENSIONAL DETAILS ONLY
DRAWING NOT TO SCALE

Figure 9

FHWA–LTPP SPS–1 DELAWARE SAMPLING PLAN
STRUCTURAL FACTORS FOR FLEXIBLE PAVEMENTS

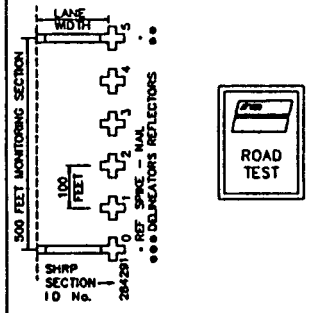
shrp

PMS PAVEMENT MANAGEMENT SYSTEMS LIMITED



SAMPLING AND TESTING PLAN FOR SECTION 100103

TYPICAL SITE SIGNING & MARKING



A ☐ BULK SAMPLE OF SUBGRADE (B3)
\+ NUCLEAR DENSITY/MOISTURE TESTING (T3)

B + NUCLEAR DENSITY/MOISTURE TESTING (T30–T32,T10)
⊗ SHOULDER PROBE (S6)
○ SHELBY TUBE SAMPLES (A7–A9)
☐ BULK SAMPLE OF FILL (B10)

C + NUCLEAR DENSITY TESTING (T90–T92)
☐ PAVER SAMPLE (BT20)

D • 4" O.D. CORES OF AC SURFACE AND TREATED BASE (C27–C30)
\+ NUCLEAR DENSITY TESTING (T126–T128)

SPS–1
US 113 DUALIZATION, SBL
ELLENDALE, DE.

PLOTDATE: MAR 31/98

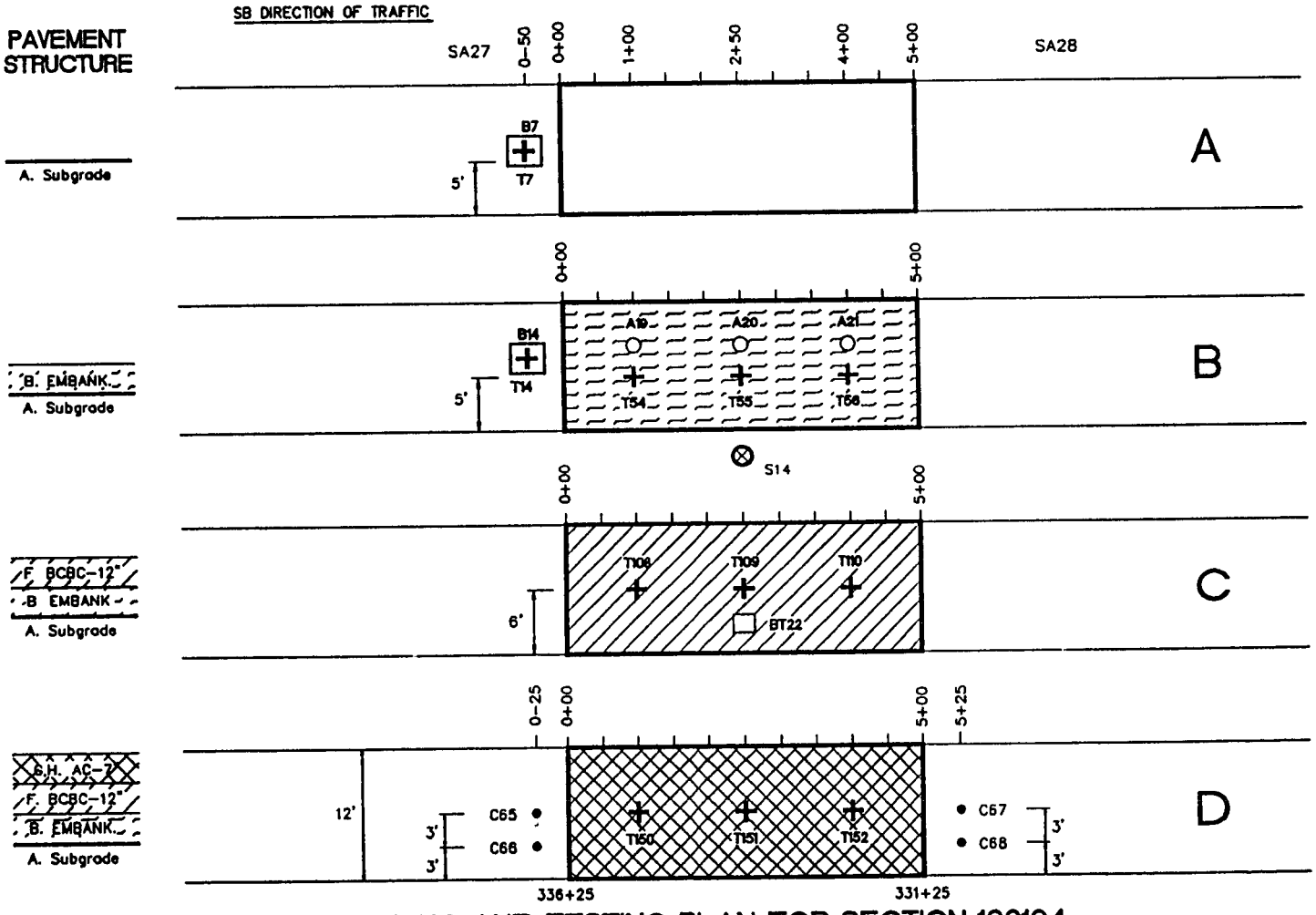
FHWA SPS–1 TEST SECTIONS ONLY
DIMENSIONAL DETAILS ONLY
DRAWING NOT TO SCALE

Figure 10

shrp

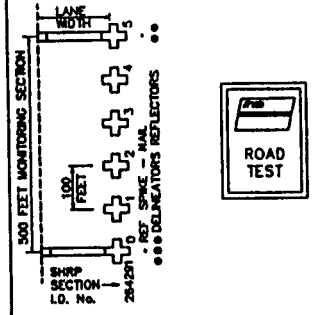
FHWA–LTPP SPS–1 DELAWARE SAMPLING PLAN
STRUCTURAL FACTORS FOR FLEXIBLE PAVEMENTS

PMS PAVEMENT MANAGEMENT SYSTEMS LIMITED



SAMPLING AND TESTING PLAN FOR SECTION 100104

TYPICAL SITE SIGNING & MARKING



A ☐ BULK SAMPLE OF SUBGRADE (B7)
+ NUCLEAR DENSITY/MOISTURE TESTING (T7)

B + NUCLEAR DENSITY/MOISTURE TESTING (T14,T54–T56)
☐ BULK SAMPLE OF FILL (B14)
⊗ SHOULDER PROBE (S14)
○ SHELBY TUBE SAMPLES (A19–A21)

C + NUCLEAR DENSITY TESTING (T108–T110)
☐ PAVER SAMPLE (BT22)

D • 4" O.D. CORES OF AC SURFACE AND TREATED BASE (C65–C68)
+ NUCLEAR DENSITY TESTING (T150–T152)

SPS–1
US 113 DUALIZATION, SBL
ELLENDALE, DE.

PLOTDATE: MAR 24/95

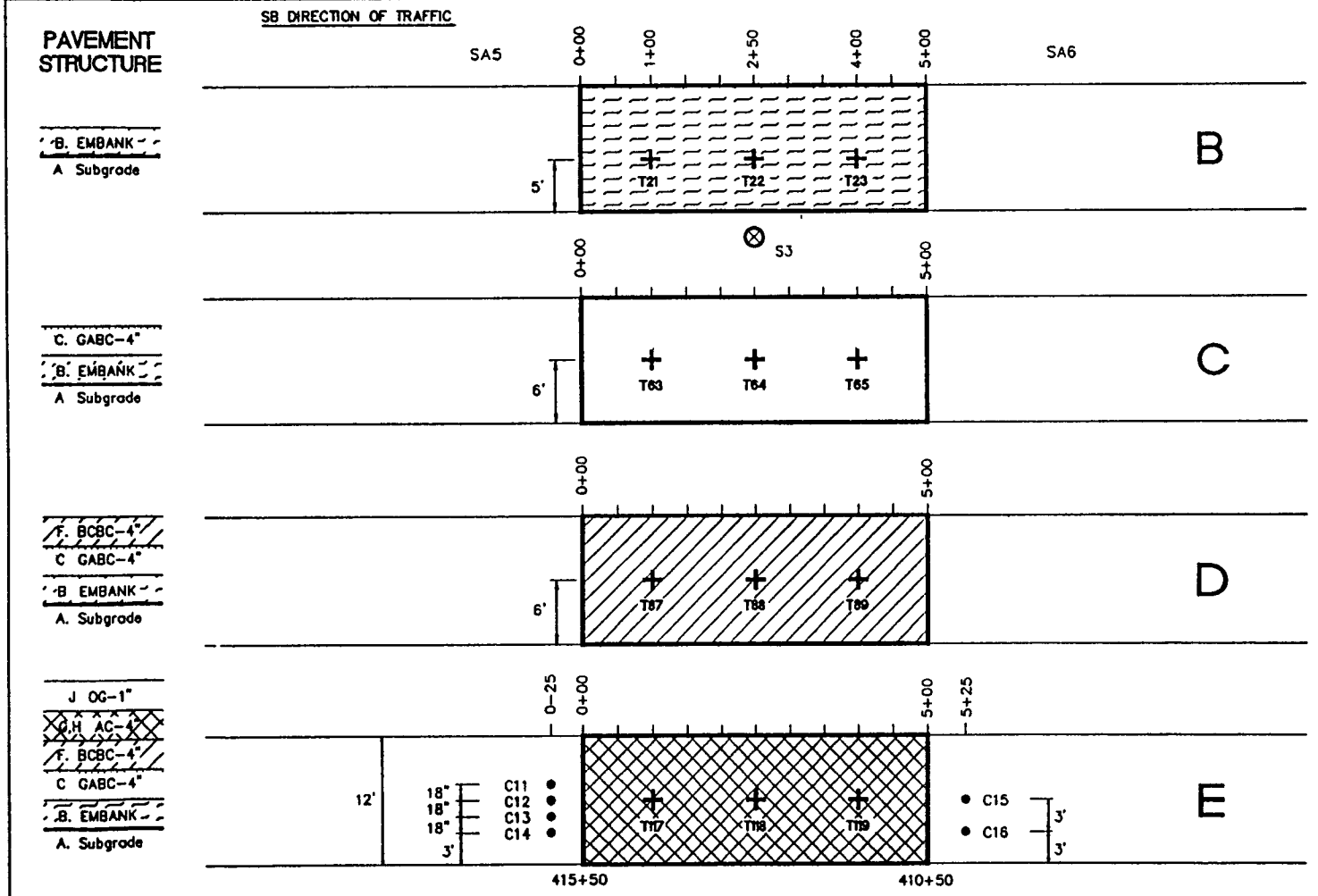
FHWA SPS–1 TEST SECTIONS ONLY
DIMENSIONAL DETAILS ONLY
DRAWING NOT TO SCALE

Figure 11

FHWA–LTPP SPS–1 DELAWARE SAMPLING PLAN
STRUCTURAL FACTORS FOR FLEXIBLE PAVEMENTS

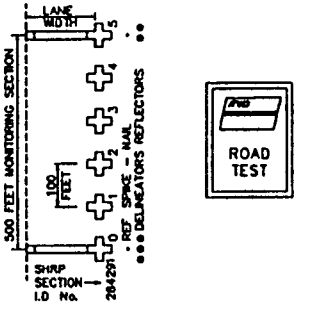
shrp

PMS PAVEMENT MANAGEMENT SYSTEMS LIMITED



SAMPLING AND TESTING PLAN FOR SECTION 100105

TYPICAL SITE SIGNING & MARKING



A

B + NUCLEAR DENSITY/MOISTURE TESTING (T21–T23)

⊗ SHOULDER PROBE (S3)

C + NUCLEAR DENSITY/MOISTURE TESTING (T63–T65)

D + NUCLEAR DENSITY TESTING (T87–T89)

E • 4" O.D CORES OF AC SURFACE AND TREATED BASE (C11–C16)

+ NUCLEAR DENSITY TESTING (T117–T119)

SPS–1
US 113 DUALIZATION, SBL
ELLENDALE, DE.

PLOTDATE: MAR 24/95

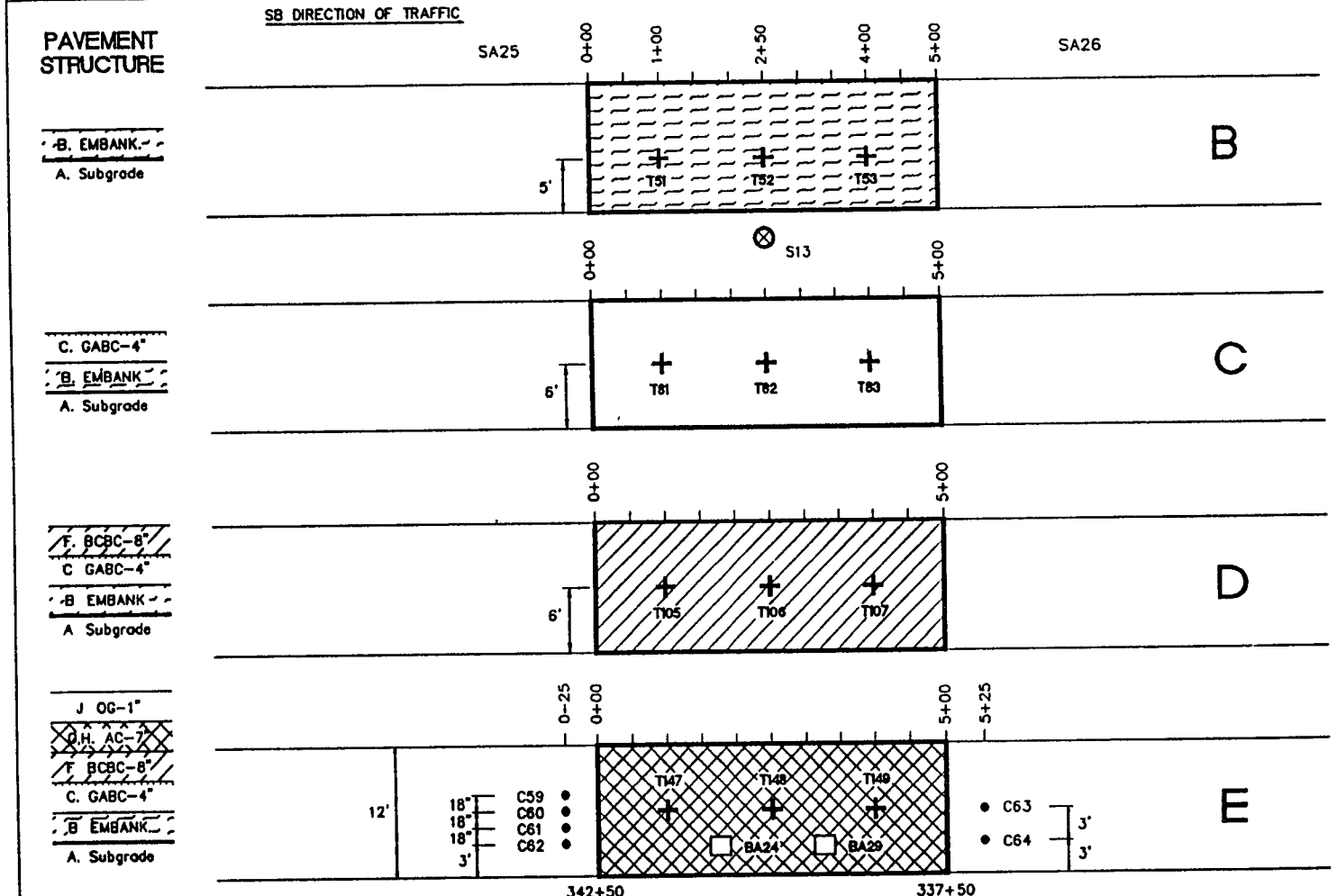
FHWA SPS–2 TEST SECTIONS ONLY
DIMENSIONAL DETAILS ONLY
DRAWING NOT TO SCALE

Figure 12

shrp

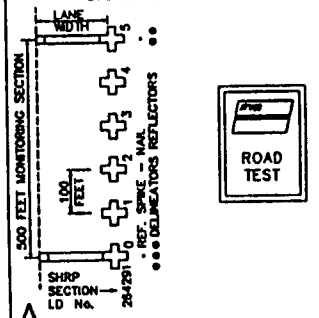
FHWA–LTPP SPS–1 DELAWARE SAMPLING PLAN
STRUCTURAL FACTORS FOR FLEXIBLE PAVEMENTS

PMS PAVEMENT MANAGEMENT SYSTEMS LIMITED



SAMPLING AND TESTING PLAN FOR SECTION 100106

TYPICAL SITE SIGNING & MARKING



A

B + NUCLEAR DENSITY/MOISTURE TESTING (T51–T53)
⊗ SHOULDER PROBE (S13)

C + NUCLEAR DENSITY/MOISTURE TESTING (T81–T83)

D + NUCLEAR DENSITY TESTING (T105–T107)

E ● 4" O.D. CORES OF AC SURFACE AND TREATED BASE (C59–C64)
+ NUCLEAR DENSITY TESTING (T147–T149)
□ PAVER SAMPLES (BA24,BA29)

SPS–1
US 113 DUALIZATION, SBL
ELLENDALE, DE.

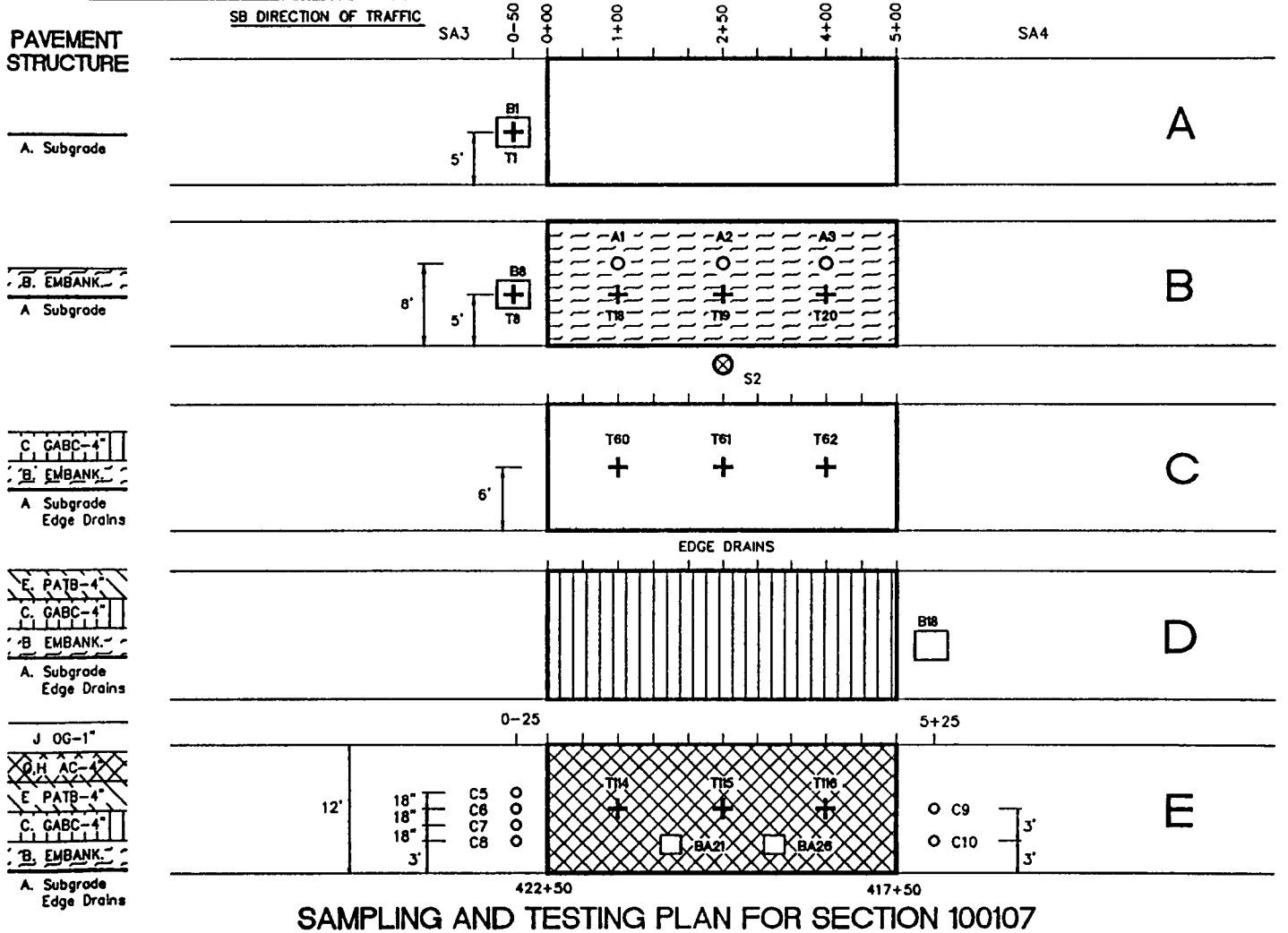
PLOTDATE: MAR 24/98

FHWA SPS–2 TEST SECTIONS ONLY
DIMENSIONAL DETAILS ONLY
DRAWING NOT TO SCALE

Figure 13

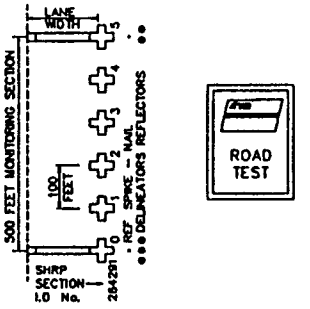
FHWA–LTPP SPS–1 DELAWARE SAMPLING PLAN
STRUCTURAL FACTORS FOR FLEXIBLE PAVEMENTS

PAVEMENT MANAGEMENT SYSTEMS LIMITED



SAMPLING AND TESTING PLAN FOR SECTION 100107

TYPICAL SITE SIGNING & MARKING



A + NUCLEAR DENSITY/MOISTURE TESTING (T1)

BULK SUBGRADE SAMPLE (B1)

B + NUCLEAR DENSITY/MOISTURE TESTING (T8,T18–T20)

⊗ SHOULDER PROBE (S2)

O SHELBY TUBE SAMPLES (A1–A3)

BULK SAMPLE OF FILL (B8)

C + NUCLEAR DENSITY TESTING (T60–T62)

D

BULK SAMPLE OF PATB FROM PAVER (B18)

E O 4" O.D. CORES OF AC SURFACE ONLY (C5–C10)

+ NUCLEAR DENSITY TESTING (T114–T116)

PAVER SAMPLES (BA21,BA26)

SPS–1
US 113 DUALIZATION, SBL
ELLENDALE, DE.

PLOTDATE: MAR 24/95

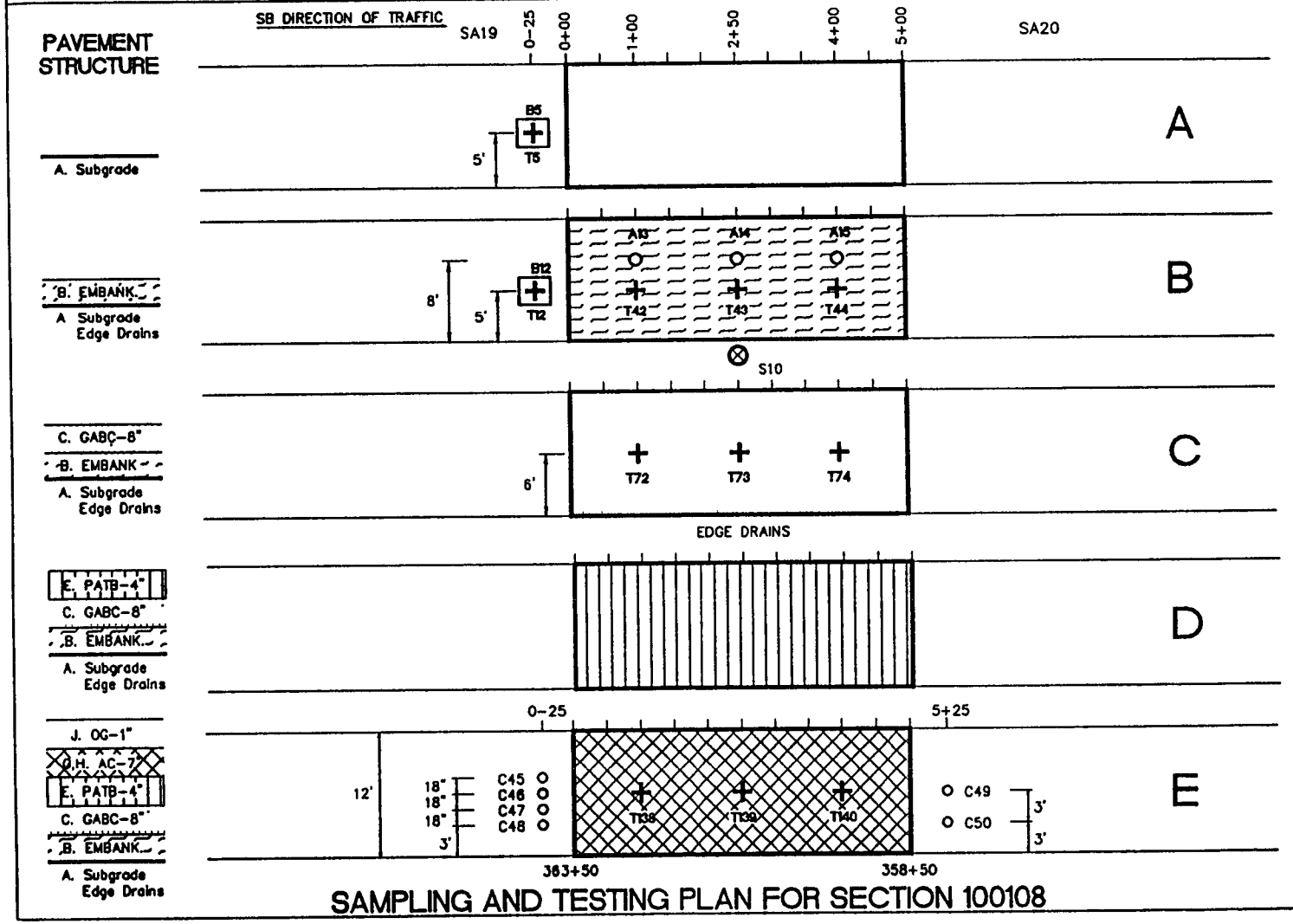
FHWA SPS–1 TEST SECTIONS ONLY
DIMENSIONAL DETAILS ONLY
DRAWING NOT TO SCALE

Figure 14

shrp

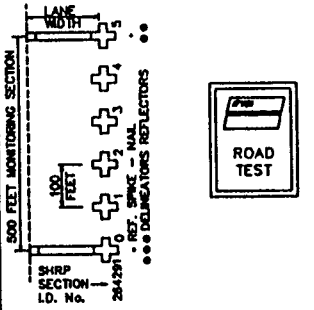
FHWA–LTPP SPS–1 DELAWARE SAMPLING PLAN
STRUCTURAL FACTORS FOR FLEXIBLE PAVEMENTS

PMS PAVEMENT MANAGEMENT SYSTEMS LIMITED



SAMPLING AND TESTING PLAN FOR SECTION 100108

TYPICAL SITE SIGNING & MARKING



A + NUCLEAR DENSITY/MOISTURE TESTING (T5)
□ BULK SUBGRADE SAMPLE (B5)

B + NUCLEAR DENSITY/MOISTURE TESTING (T12,T42–T44)
⊗ SHOULDER PROBE (S10)
□ BULK EMBANKMENT FILL (B12)

C + NUCLEAR DENSITY/MOISTURE TESTING (T72–T74)

D

E ○ 4" O.D. CORES OF AC SURFACE ONLY (C45–C50)
+ NUCLEAR DENSITY TESTING (T138–T140)

SPS–1
US 113 DUALIZATION, SBL
ELLENDALE, DE.

REVISED MAR 24/95

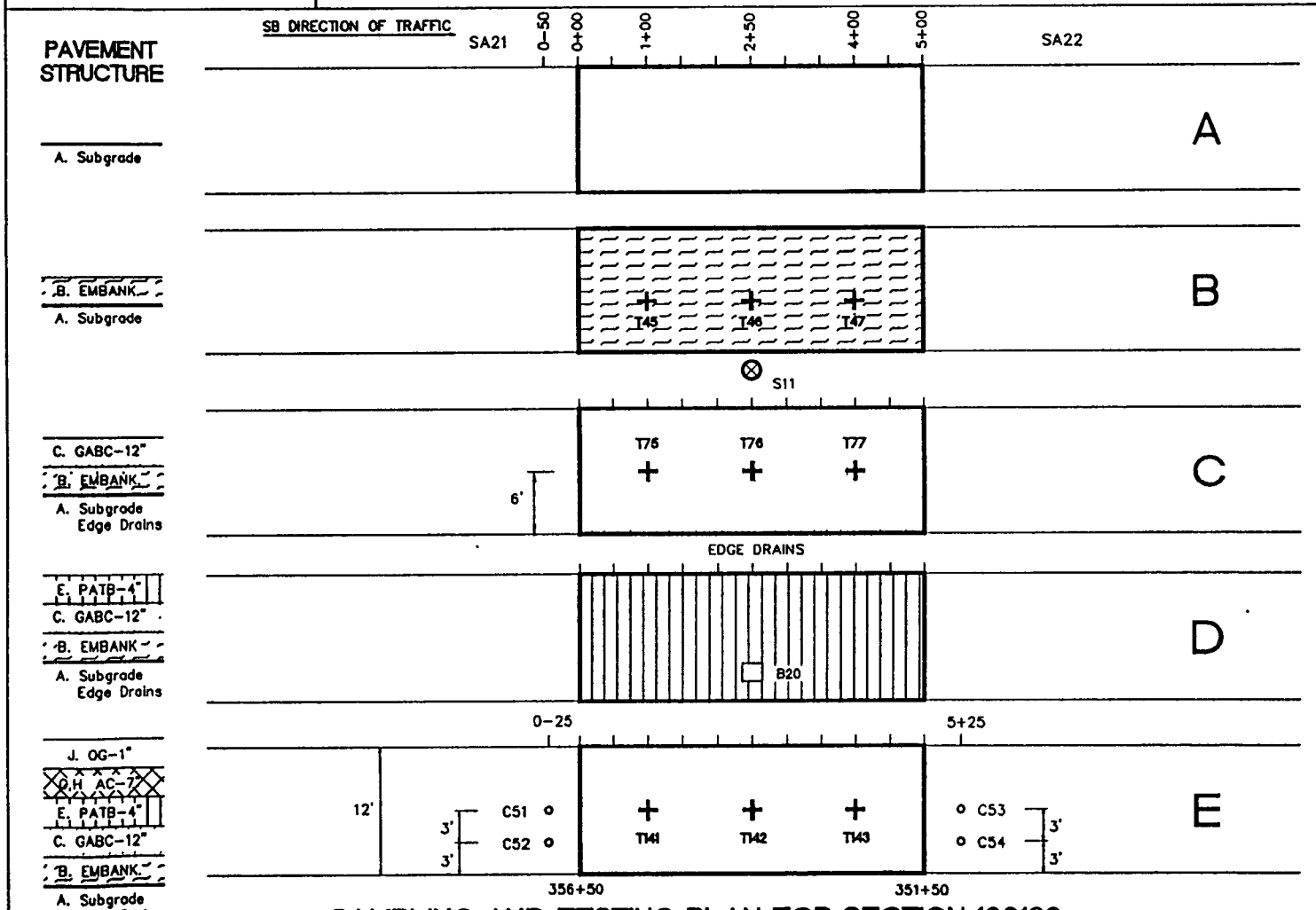
FHWA SPS–2 TEST SECTIONS ONLY
DIMENSIONAL DETAILS ONLY
DRAWING NOT TO SCALE

Figure 15

shrp

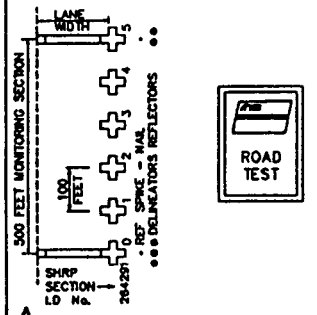
FHWA–LTPP SPS–1 DELAWARE SAMPLING PLAN
STRUCTURAL FACTORS FOR FLEXIBLE PAVEMENTS

PMS PAVEMENT MANAGEMENT SYSTEMS LIMITED



SAMPLING AND TESTING PLAN FOR SECTION 100109

TYPICAL SITE SIGNING & MARKING



A

B + NUCLEAR DENSITY/MOISTURE TESTING (T45–T47)

⊗ SHOULDER PROBE (S11)

C + NUCLEAR DENSITY/MOISTURE TESTING (T75–T77)

D ☐ BULK PAVER PATB SAMPLE (B20)

E ○ 4" O.D CORES OF AC SURFACE ONLY (C51–C54)

+ NUCLEAR DENSITY TESTING (T141–T143)

SPS–1
US 113 DUALIZATION, SBL
ELLENDALE, DE.

PLOTDATE: MAR 24/95

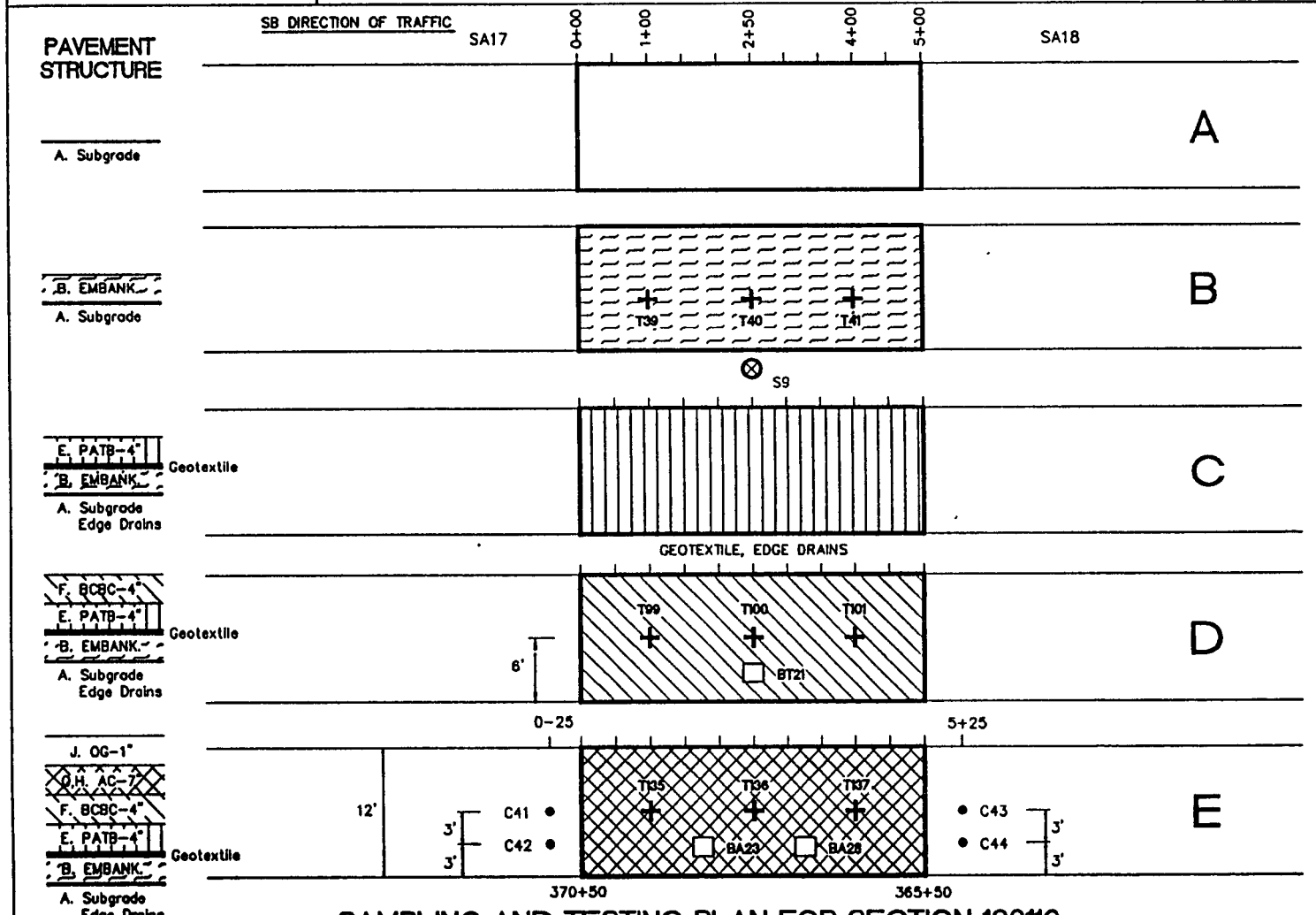
FHWA SPS–2 TEST SECTIONS ONLY
DIMENSIONAL DETAILS ONLY
DRAWING NOT TO SCALE

Figure 16

FHWA–LTPP SPS–1 DELAWARE SAMPLING PLAN
STRUCTURAL FACTORS FOR FLEXIBLE PAVEMENTS

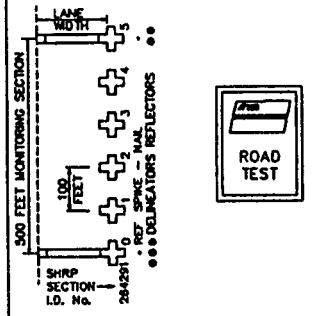
shrp

PMS PAVEMENT MANAGEMENT SYSTEMS LIMITED



SAMPLING AND TESTING PLAN FOR SECTION 100110

TYPICAL SITE SIGNING & MARKING



A

B + NUCLEAR DENSITY/MOISTURE TESTING (T39–T41)

⊗ SHOULDER PROBE (S9)

C

D + NUCLEAR DENSITY TESTING (T99–T101)

□ PAVER SAMPLE (BT21)

E ● 4" O.D. CORES OF AC SURFACE AND TREATED BASE (C41–C44)

+ NUCLEAR DENSITY TESTING (T135–T137)

□ PAVER SAMPLES (BA23,BA28)

SPS–1
US 113 DUALIZATION, SBL
ELLENDALE, DE.

PLOTDATE: MAR 24/98

FHWA SPS–2 TEST SECTIONS ONLY
DIMENSIONAL DETAILS ONLY
DRAWING NOT TO SCALE

Figure 17

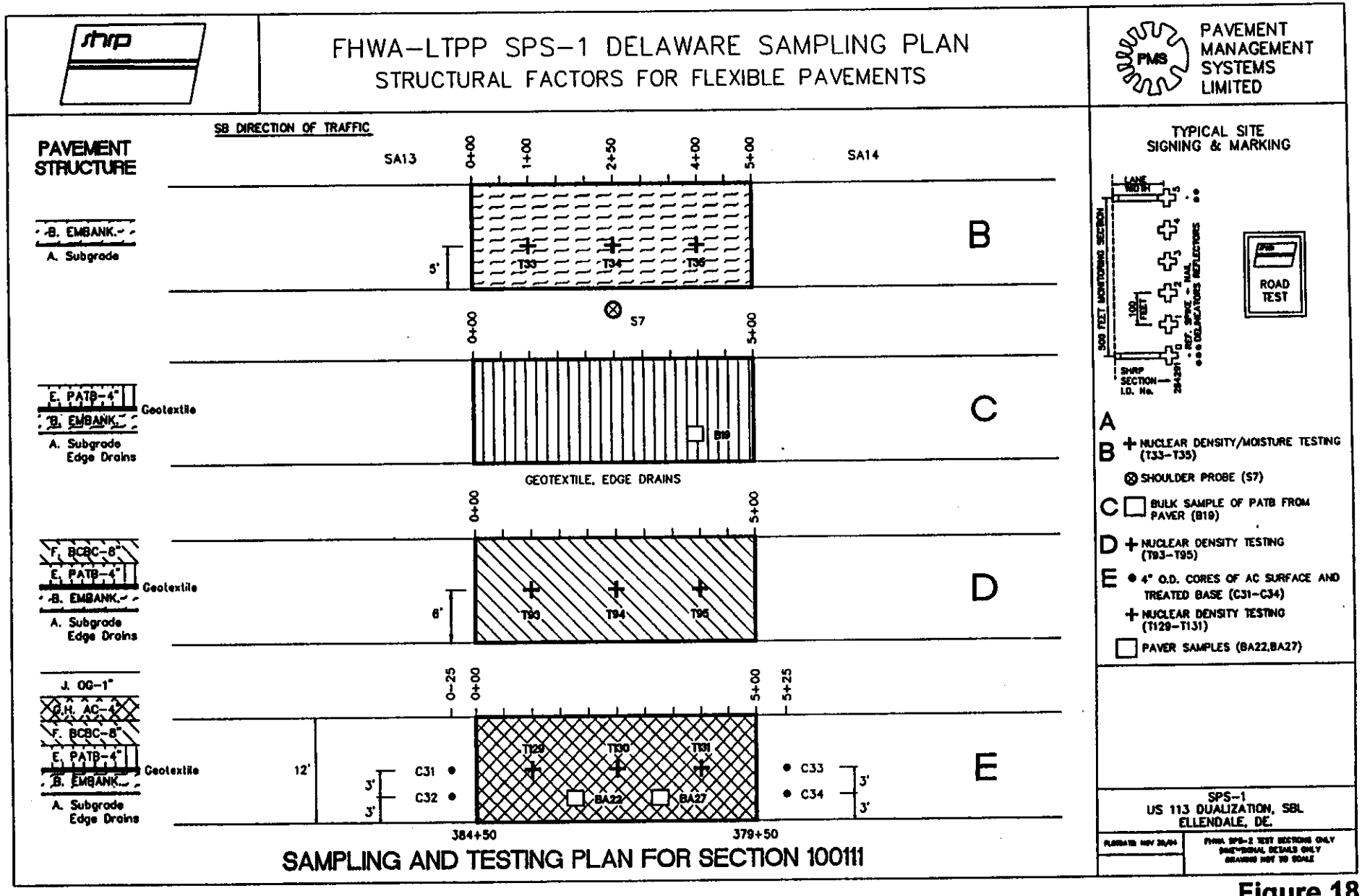
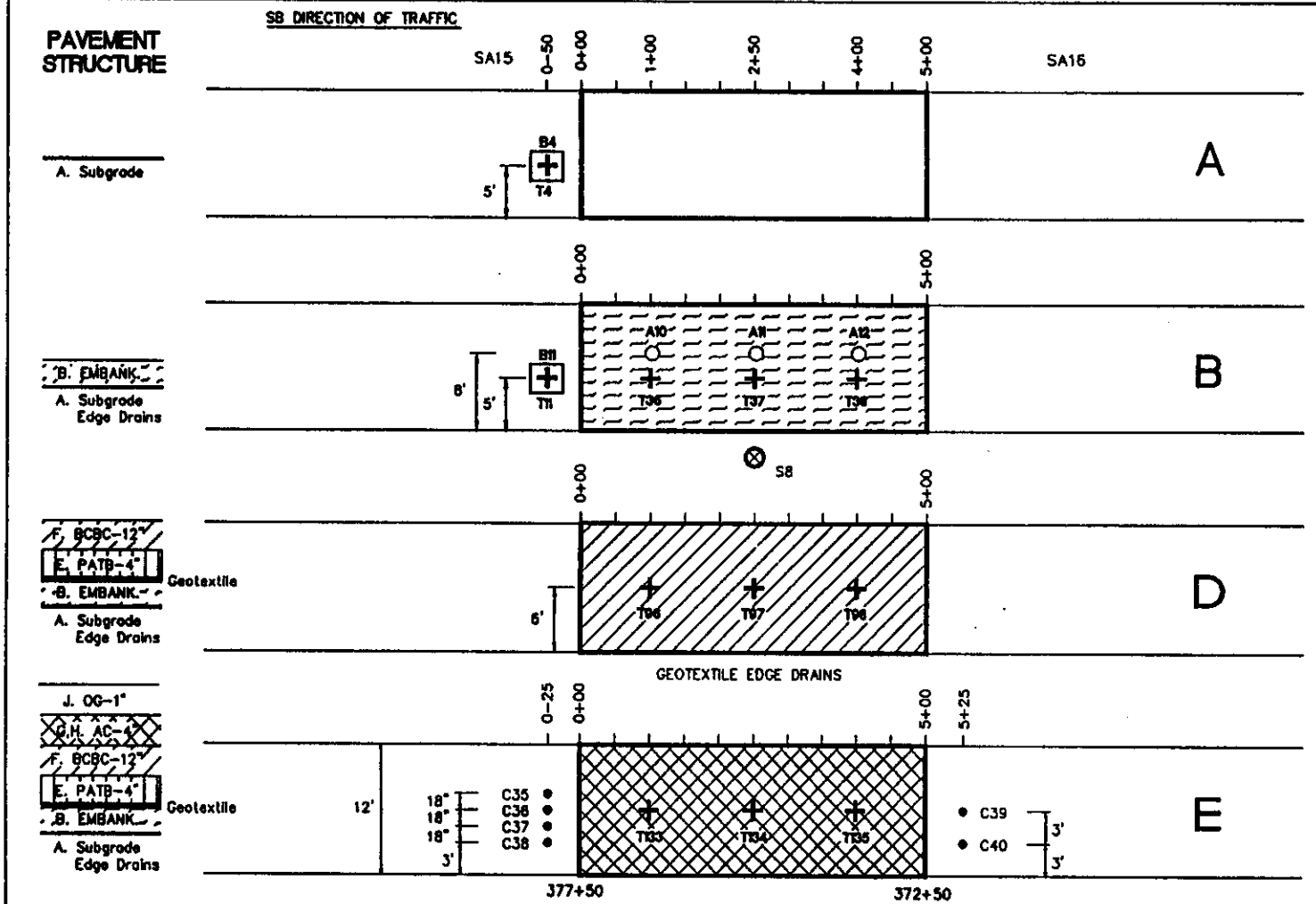

FHWA–LTPP SPS–1 DELAWARE SAMPLING PLAN
STRUCTURAL FACTORS FOR FLEXIBLE PAVEMENTS
PAVEMENT MANAGEMENT SYSTEMS LIMITED
SB DIRECTION OF TRAFFIC
PAVEMENT STRUCTURE
SA13
SA14
0+00
1+00
2+50
4+00
5+00
B. EMBANK.
A. Subgrade
5'
T33
T34
T35
B
S7
E. PATB–4"
B. EMBANK.
A. Subgrade
Edge Drains
Geotextile
B19
C
GEOTEXTILE, EDGE DRAINS
F. BCBC–8"
E. PATB–4"
B. EMBANK.
A. Subgrade
Edge Drains
Geotextile
6'
T93
T94
T95
D
J. OG–1"
G.H. AC–4"
F. BCBC–8"
E. PATB–4"
B. EMBANK.
A. Subgrade
Edge Drains
Geotextile
0–25
5+25
12'
3'
3'
C31
C32
T129
T130
T131
BA22
BA27
C33
C34
3'
3'
E
384+50
379+50
SAMPLING AND TESTING PLAN FOR SECTION 100111
TYPICAL SITE SIGNING & MARKING
LANE WIDTH
500 FEET MONITORING SECTION
100 FEET
REF. SPIKE – NAIL
DELINEATORS REFLECTORS
SHRP SECTION — I.D. No.
ROAD TEST
A
B + NUCLEAR DENSITY/MOISTURE TESTING (T33–T35)
⊗ SHOULDER PROBE (S7)
C □ BULK SAMPLE OF PATB FROM PAVER (B19)
D + NUCLEAR DENSITY TESTING (T93–T95)
E • 4" O.D. CORES OF AC SURFACE AND TREATED BASE (C31–C34)
+ NUCLEAR DENSITY TESTING (T129–T131)
□ PAVER SAMPLES (BA22,BA27)
SPS–1
US 113 DUALIZATION, SBL
ELLENDALE, DE.

Figure 18

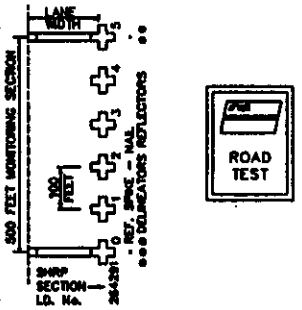
FHWA–LTPP SPS–1 DELAWARE SAMPLING PLAN
STRUCTURAL FACTORS FOR FLEXIBLE PAVEMENTS

PAVEMENT MANAGEMENT SYSTEMS LIMITED



SAMPLING AND TESTING PLAN FOR SECTION 100112

TYPICAL SITE SIGNING & MARKING



A ☐ BULK SAMPLE OF SUBGRADE (B4)
+ NUCLEAR DENSITY/MOISTURE TESTING (T4)

B + NUCLEAR DENSITY/MOISTURE TESTING (T11, T36–T38)
⊗ SHOULDER PROBE (S8)
○ SHELBY TUBE SAMPLES (A10–A12)
☐ BULK SAMPLE OF FILL (B11)

C

D + NUCLEAR DENSITY TESTING (T96–T98)

E • 4" O.D. CORES OF AC SURFACE AND TREATED BASE (C35–C40)
+ NUCLEAR DENSITY TESTING (T133–T135)

SPS–1
US 113 DUALIZATION, SBL
ELLENDALE, DE.

PLOTTED: MAR 24/98

FHWA SPS–2 TEST SECTIONS ONLY
INDIVIDUAL DETAILS ONLY
DRAWING NOT TO SCALE

Figure 19

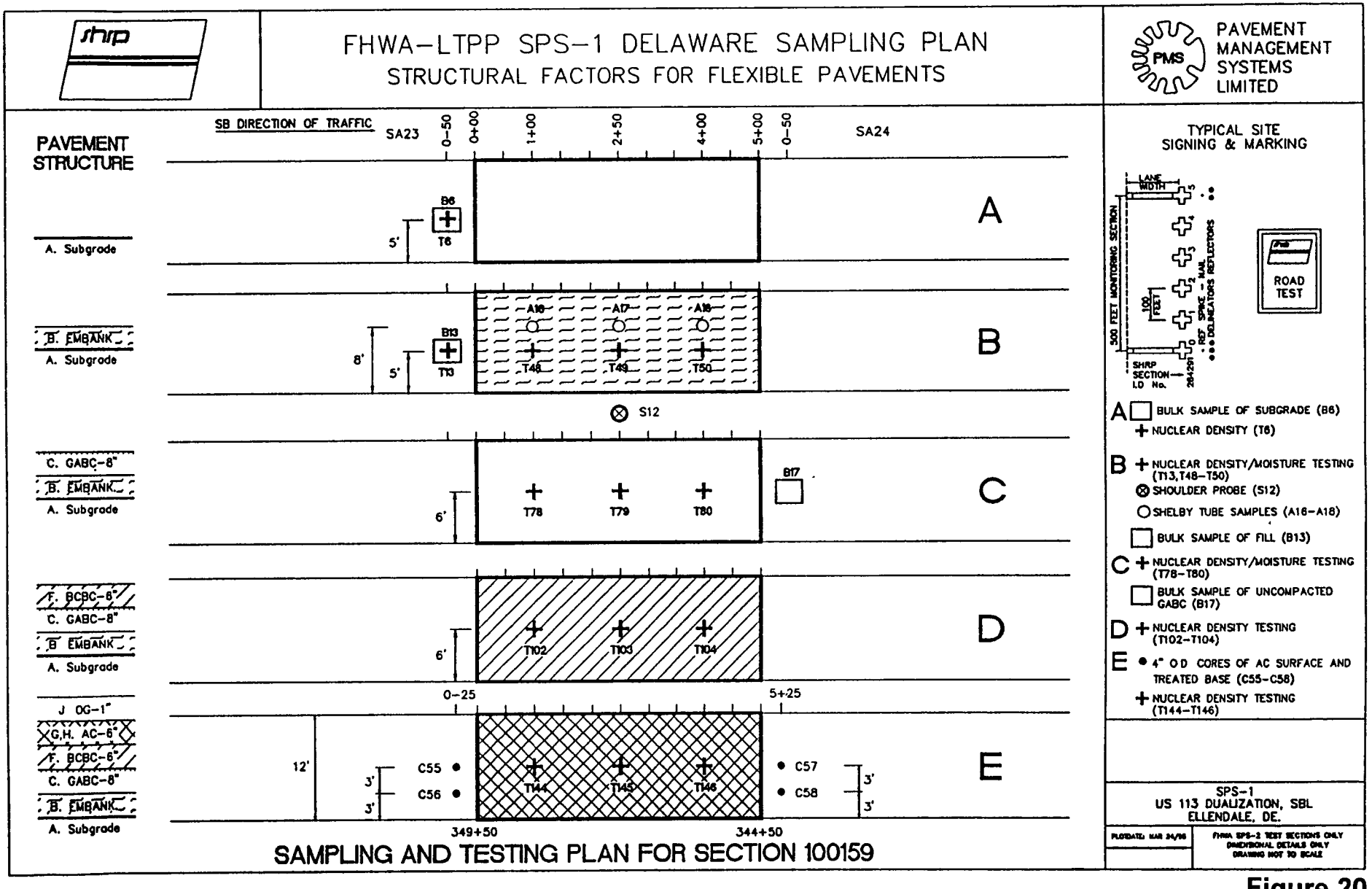
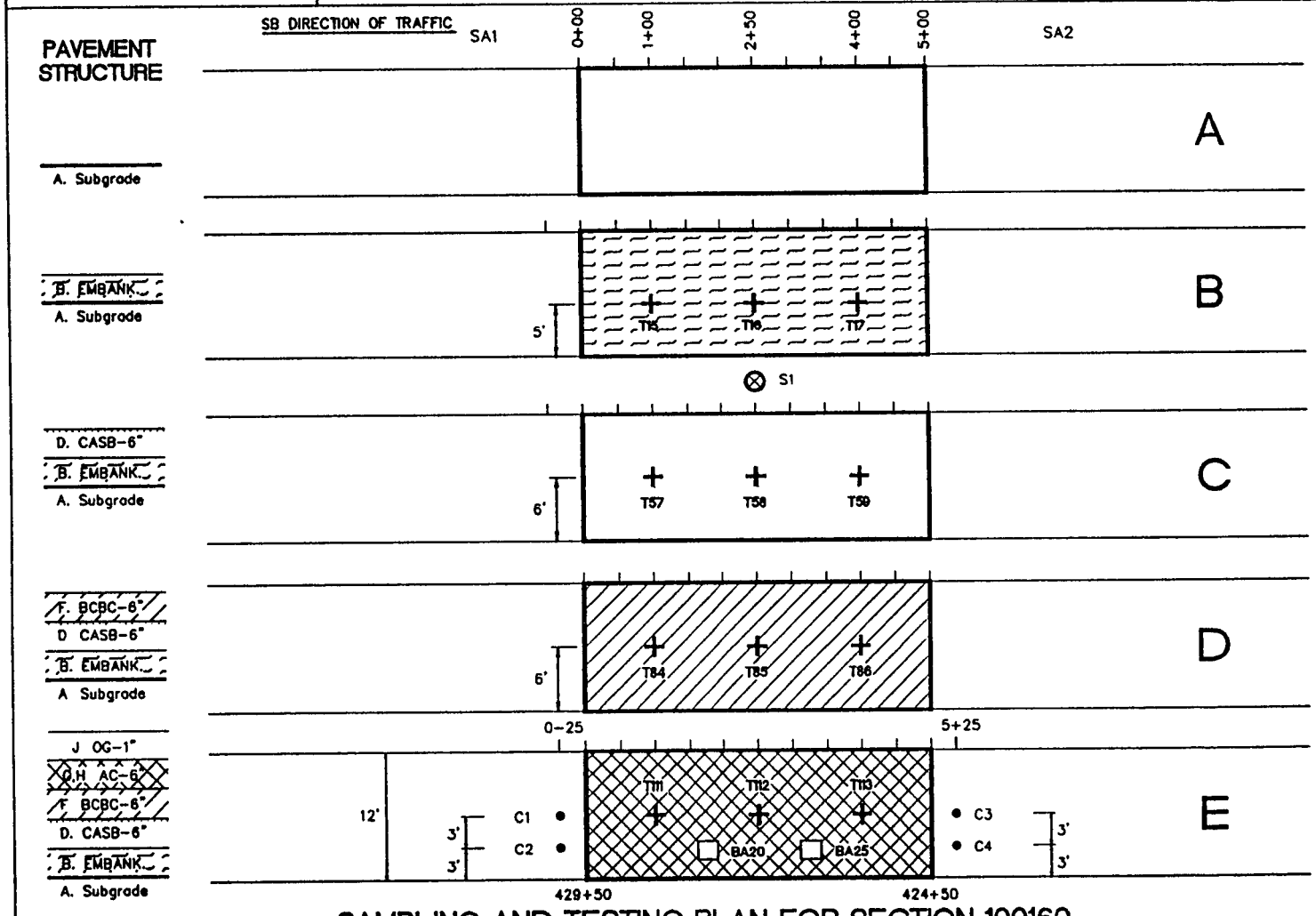

shrp
FHWA-LTPP SPS-1 DELAWARE SAMPLING PLAN
STRUCTURAL FACTORS FOR FLEXIBLE PAVEMENTS
PMS
PAVEMENT MANAGEMENT SYSTEMS LIMITED
PAVEMENT STRUCTURE
SB DIRECTION OF TRAFFIC
SA23
SA24
0-50
0+00
1+00
2+50
4+00
5+00
0-50
A. Subgrade
B. EMBANK
A. Subgrade
C. GABC-8"
B. EMBANK
A. Subgrade
F. BCBC-6"
C. GABC-8"
B EMBANK
A. Subgrade
J OG-1"
G.H. AC-6"
F. BCBC-6"
C. GABC-8"
B. EMBANK
A. Subgrade
B6
T6
5'
A
A16
A17
A18
B13
T13
T48
T49
T50
8'
5'
B
S12
B17
T78
T79
T80
6'
C
T102
T103
T104
6'
D
0-25
5+25
12'
C55
C56
C57
C58
3'
3'
3'
3'
T144
T145
T146
E
349+50
344+50
SAMPLING AND TESTING PLAN FOR SECTION 100159
TYPICAL SITE SIGNING & MARKING
LANE WIDTH
500 FEET MONITORING SECTION
100 FEET
REF SPIKE - NAIL
DELINEATORS REFLECTORS
ROAD TEST
SHRP SECTION LD No.
284291
A BULK SAMPLE OF SUBGRADE (B6)
NUCLEAR DENSITY (T6)
B NUCLEAR DENSITY/MOISTURE TESTING (T13,T48-T50)
SHOULDER PROBE (S12)
SHELBY TUBE SAMPLES (A16-A18)
BULK SAMPLE OF FILL (B13)
C NUCLEAR DENSITY/MOISTURE TESTING (T78-T80)
BULK SAMPLE OF UNCOMPACTED GABC (B17)
D NUCLEAR DENSITY TESTING (T102-T104)
E 4" O D CORES OF AC SURFACE AND TREATED BASE (C55-C58)
NUCLEAR DENSITY TESTING (T144-T146)
SPS-1
US 113 DUALIZATION, SBL
ELLENDALE, DE.
PLOTDATE: MAR 24/98
FHWA SPS-2 TEST SECTIONS ONLY
DIMENSIONAL DETAILS ONLY
DRAWING NOT TO SCALE

Figure 20

shrp

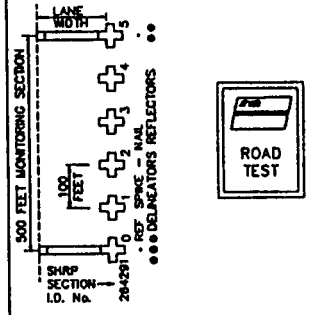
FHWA–LTPP SPS–1 DELAWARE SAMPLING PLAN
STRUCTURAL FACTORS FOR FLEXIBLE PAVEMENTS

PMS PAVEMENT MANAGEMENT SYSTEMS LIMITED



SAMPLING AND TESTING PLAN FOR SECTION 100160

TYPICAL SITE SIGNING & MARKING



A

B + NUCLEAR DENSITY/MOISTURE TESTING (T15–T17)

⊗ SHOULDER PROBE (S1)

C + NUCLEAR DENSITY/MOISTURE TESTING (T57–T59)

D + NUCLEAR DENSITY TESTING (T84–T86)

E • 4" OD CORES OF AC SURFACE AND TREATED BASE (C1–C4)

+ NUCLEAR DENSITY TESTING (T111–T113)

□ PAVER SAMPLES (BA20,BA25)

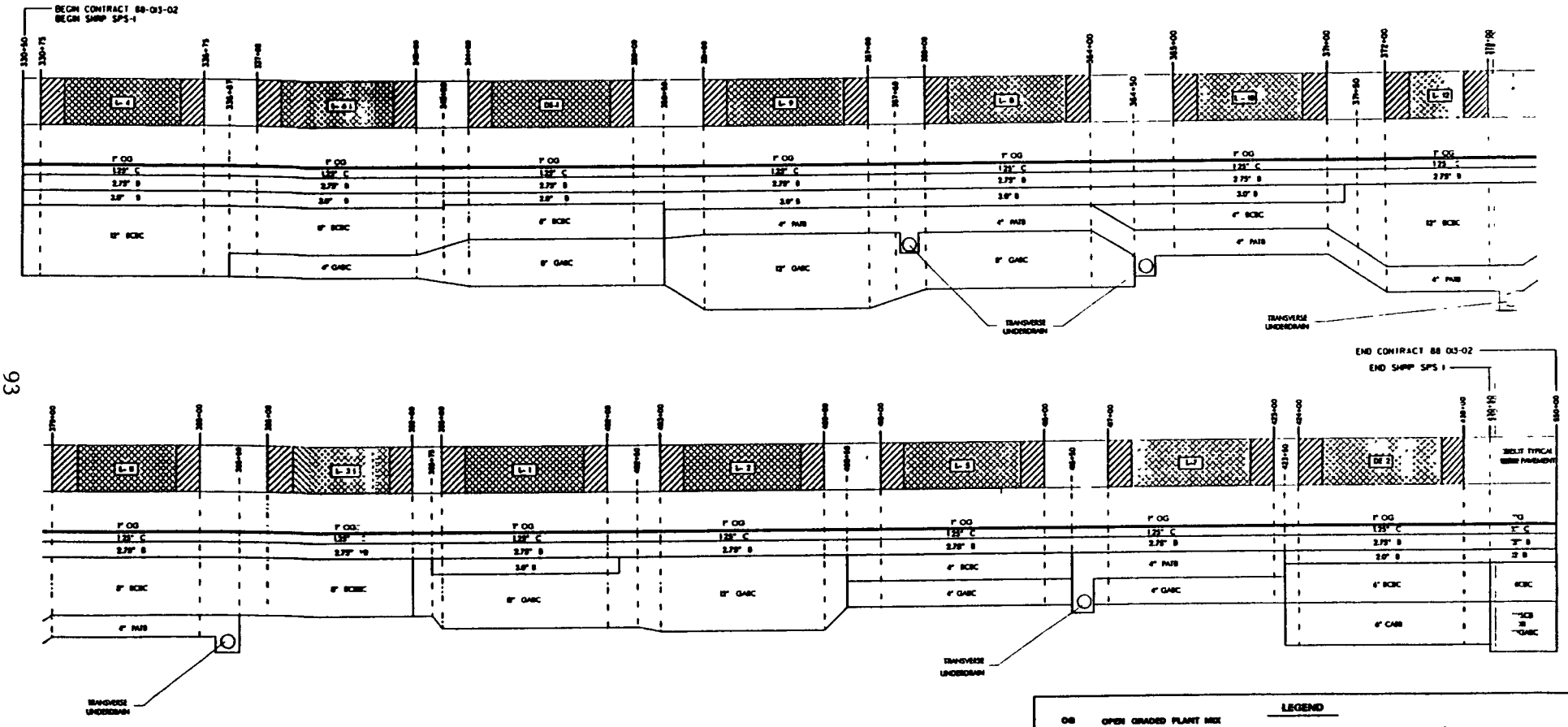
SPS–1
US 113 DUALIZATION, SBL
ELLENDALE, DE.

PLOTDATE: MAR 24/98

FHWA SPS–2 TEST SECTIONS ONLY
DIMENSIONAL DETAILS ONLY
DRAWING NOT TO SCALE

Figure 21

TEST SECTION SCHEMATIC
SHRP SPS-1 (FLEXIBLE PAVEMENTS)



LEGEND

OG	OPEN GRADED PLANT MIX
C	HOT MIX, TYPE C
B	HOT MIX, TYPE B
BCBC	BITUMINOUS BASE COURSE
PATB	PERMEABLE ASPHALT TREATED BASE
GABC	GRADED AGGREGATE BASE COURSE, TYPE B
SCB	SOIL CEMENT BASE COURSE
CASB	COAL ASH STABILIZED SOIL BASE COURSE

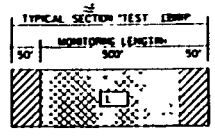
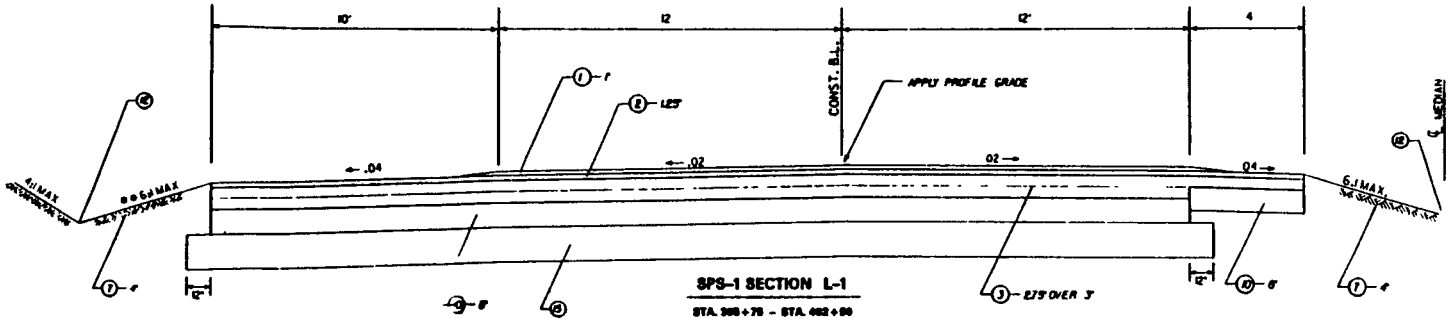


Figure22

REVISIONS

93

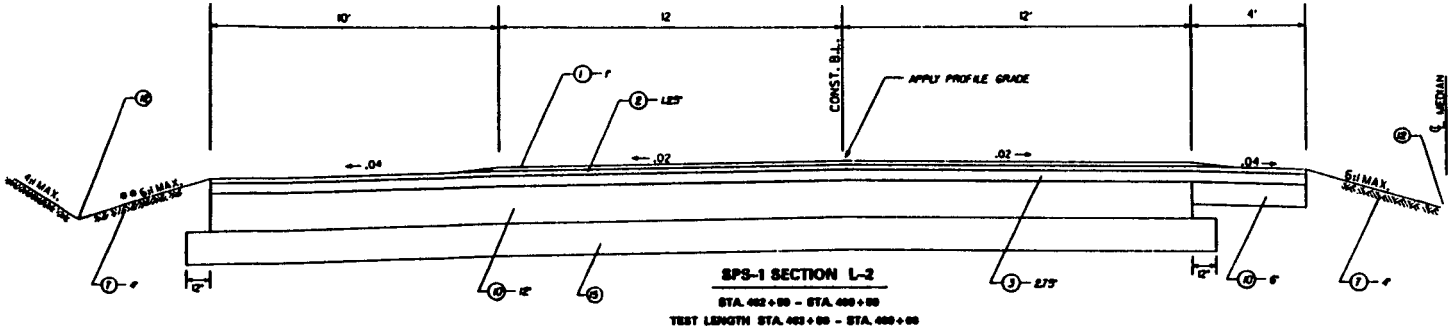
SOUTHBOUND TYPICAL SECTIONS N.T.S.
SHRP SPS-1



SPS-1 SECTION L-1

STA. 388+78 – STA. 402+00

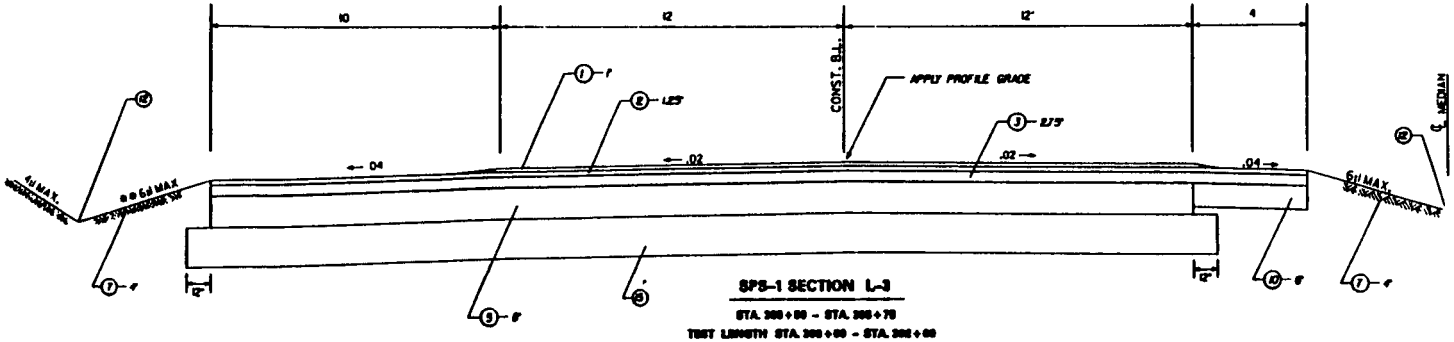
TEST LENGTH STA. 390+00 – STA. 402+00



SPS-1 SECTION L-2

STA. 402+00 – STA. 488+00

TEST LENGTH STA. 402+00 – STA. 488+00



SPS-1 SECTION L-3

STA. 388+00 – STA. 388+78

TEST LENGTH STA. 388+00 – STA. 388+00

LEGEND

(1) OPEN GRADED HOT MIX
(2) HOT MIX HOT LAID BIT CONC. PAVT TYPE C
(3) HOT MIX HOT LAID BIT CONC. PAVT TYPE B
(4) EXISTING HOT MIX OVERLAY (APPROX.)
(5) BITUMINOUS CONCRETE BASE COURSE
(6) REINFORCED ASPHALTIC MEMBRANE
(7) TOPSOIL, SEED AND MULCH TO LOC.
(8) MILL PAVEMENT TO CONC. SURFACE WIDTH
(10) GRADED AGGREGATE BASE COURSE, TYPE B
(11) P.C.C. PANNIN CURB, TYPE 1 MOD.
(12) CONSTRUCT DITCH WHERE SHOWN
(15) BORROW TYPE A (MAX. 2' LIFTS)
(16) PERMEABLE ASPHALT TREATED BASE
(17) UNDERDRAIN (SEE DETAIL)
(18) GEOTEXTILE
(19) MILL PAVEMENT 1'-4" WIDE X 2.75" DEEP
(20) REMOVE EXISTING LANE AND SHOULDER
(21) P.C.C. SIDEWALK 6"
(22) ALTERNATE SOIL CEMENT BASE OR GRADED AGGREGATE BASE COURSE, TYPE B

REVISIONS

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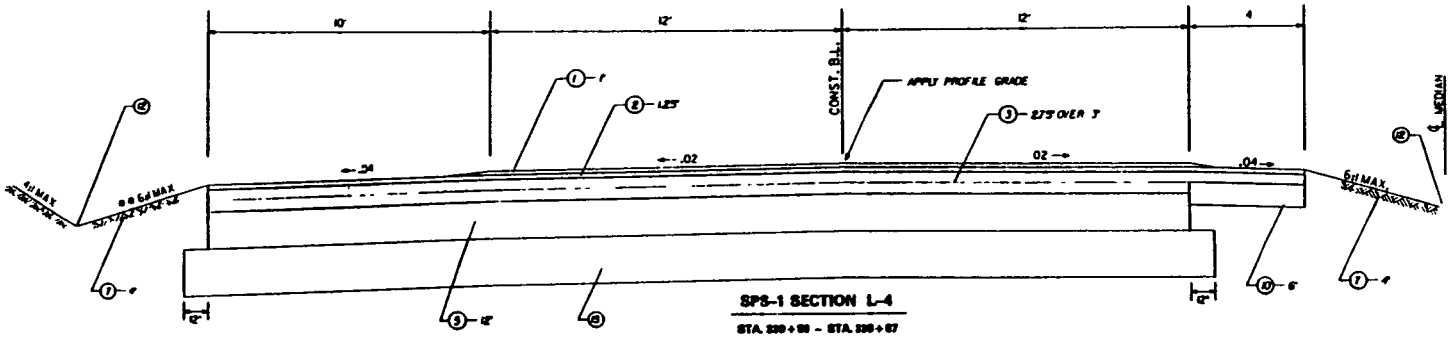
Figure 23

SOUTHBOUND TYPICAL SECTIONS N.T.S.

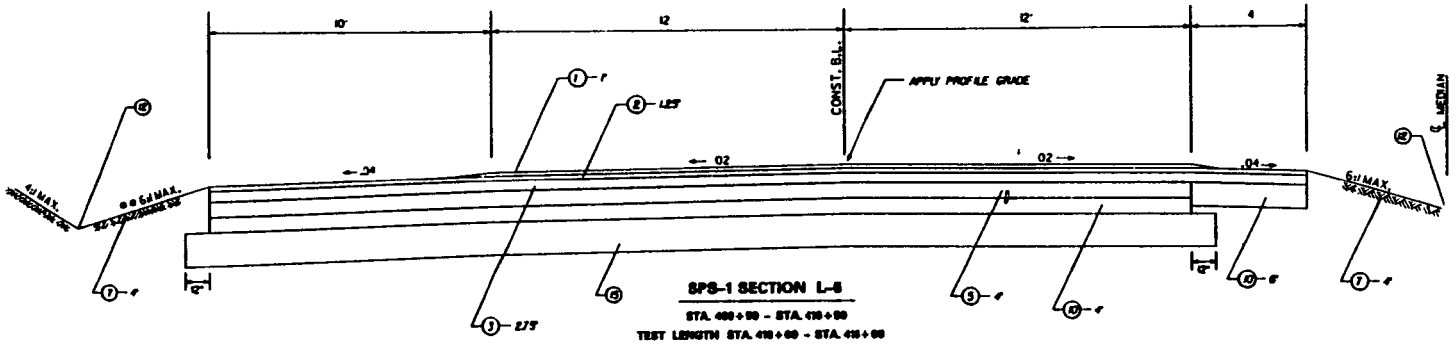
SHW SPS-1



SPS-1 SECTION L-4

STA. 330+00 – STA. 330+07

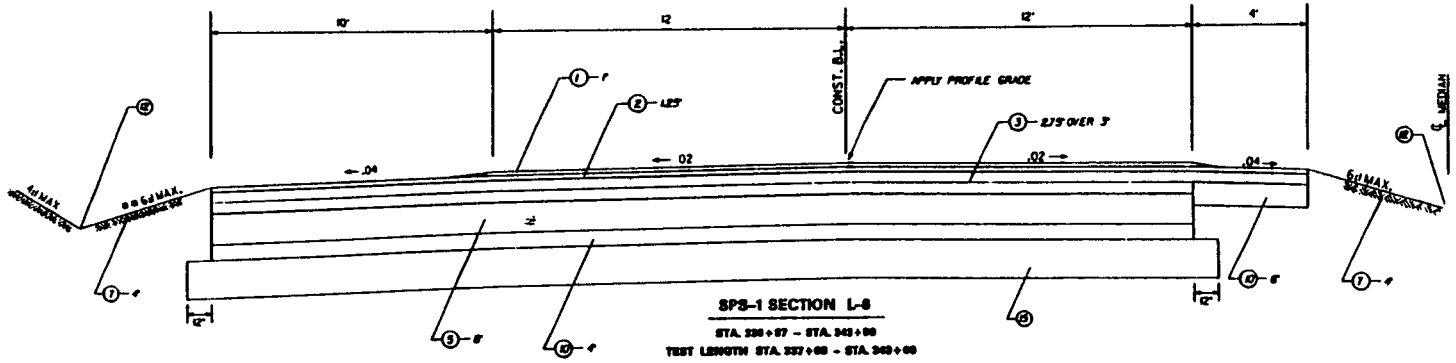
TEST LENGTH STA. 330+70 – STA. 330+75



SPS-1 SECTION L-5

STA. 400+00 – STA. 410+00

TEST LENGTH STA. 410+00 – STA. 410+00



SPS-1 SECTION L-6

STA. 330+07 – STA. 343+00

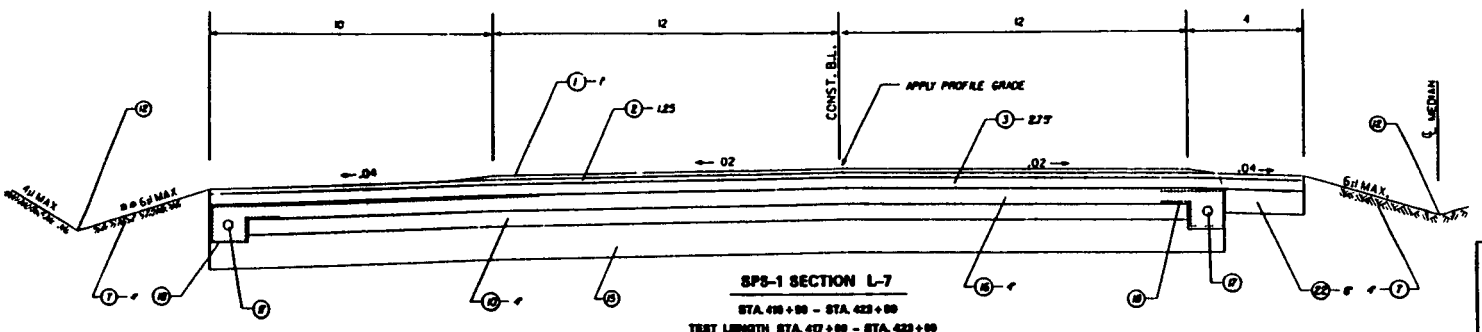
TEST LENGTH STA. 337+00 – STA. 343+00

LEGEND

1. OPEN GRADED HOT MIX
2. HOT MIX HOT LAID BIT. CONC. PAVT. (TYPE
3. HOT MIX HOT LAID BIT. CONC. PAVT. (TYPE
4. EXISTING HOT MIX OVERLAY (APPROX. 4")
5. BITUMINOUS CONCRETE BASE COURSE
6. REINFORCED ASPHALTIC MEMBRANE 6"
7. TOPSOIL, SEED AND MULCH TO LOC.
8. MILL PAVEMENT TO CONC. SURFACE (AVG. 5")
10. GRADED AGGREGATE BASE COURSE (TYPE 3
11. P.C.C. PARKWAY CURB, TYPE 1 MOD.
12. CONSTRUCT DITCH WHERE SHOWN
15. BORROW TYPE A (MAX. = 2' 6" LIFTS)
16. PERMEABLE ASPHALT TREATED BASE
17. UNDERDRAIN 4" (SEE DETAIL)
18. GEOTEXTILE
19. MILL PAVEMENT (4' WIDE × 2.5" DEEP)
20. REMOVE EXISTING LANE AND SHOULDER
21. P.C.C. SIDEWALK 6"
22. ALTERNATE SOIL CEMENT BASE OR GRADED AGGREGATE BASE COURSE, TYPE B

Figure 24

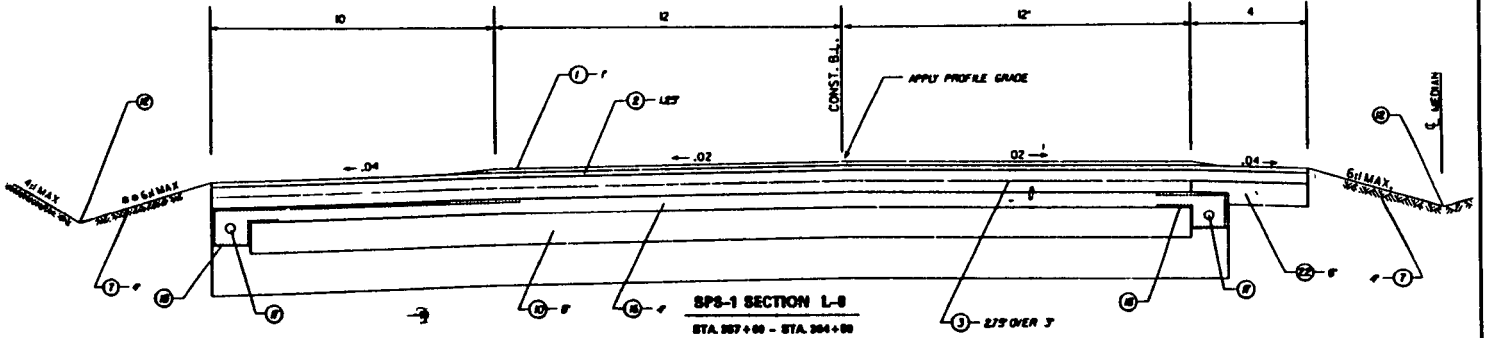
SOUTHBOUND TYPICAL SECTION!
SHRP SPS-1



SPS-1 SECTION L-7

STA. 416+00 – STA. 423+00

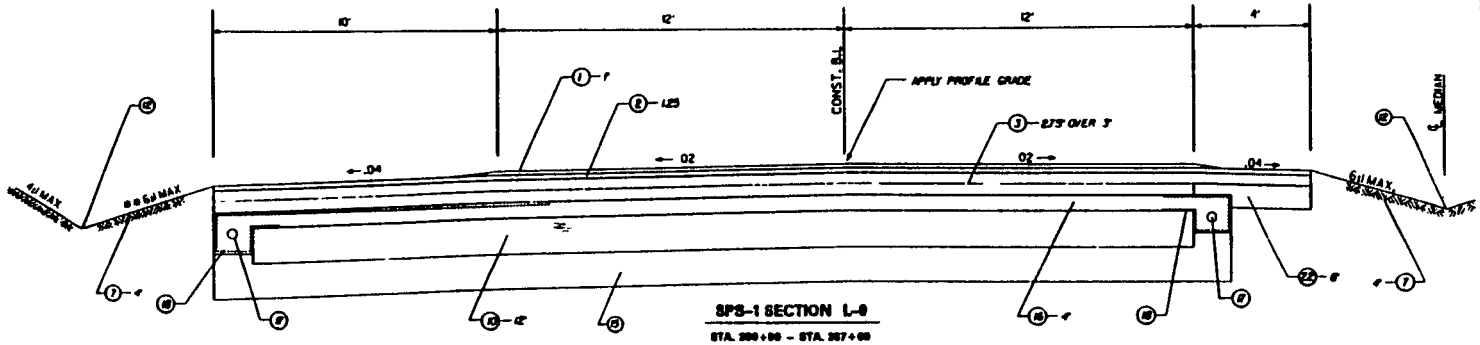
TEST LENGTH STA. 417+00 – STA. 423+00



SPS-1 SECTION L-8

STA. 387+00 – STA. 394+00

TEST LENGTH STA. 388+00 – STA. 394+00



SPS-1 SECTION L-9

STA. 388+00 – STA. 387+00

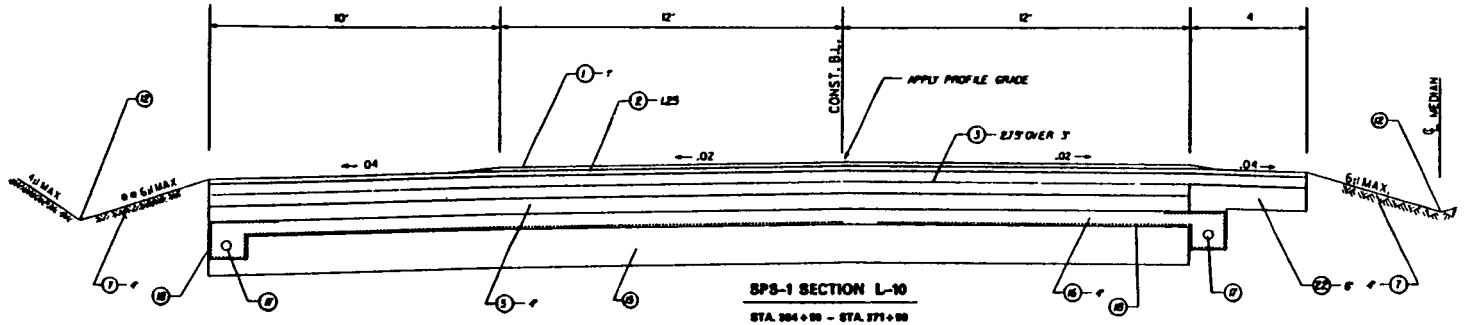
TEST LENGTH STA. 381+00 – STA. 387+00

LEGEND

1. OPEN GRADED HOT MIX
2. HOT MIX, HOT LAID, BIT CONC. PAV'T., TYPE C
3. HOT MIX HOT LAID, BIT CONC. PAV'T., TYPE B
4. EXISTING HOT MIX OVERLAY (APPROX. 6")
5. BITUMINOUS CONCRETE BASE COURSE
6. REINFORCED ASPHALTIC MEMBRANE (4")
7. TOPSOIL, SEED AND MULCH TO LOC.
8. MILL PAVEMENT TO CONC. SURFACE (4 INCH'S)
10. GRADED AGGREGATE BASE COURSE, TYPE B
11. P.C.C. PARKWAY CURB, TYPE 1 MOD.
12. CONSTRUCT DITCH WHERE SHOWN
15. BORROW TYPE A (MAX. = 2 6" LIFTS)
16. PERMEABLE ASPHALT TREATED BASE
17. UNDERDRAIN 4" (SEE DETAIL)
18. GEOTEXTILE
19. MILL PAVEMENT (4' WIDE X 2.5" DEEP)
20. REMOVE EXISTING LANE AND SHOULDER
21. P.C.C. SIDEWALK 6"
22. ALTERNATE - SOIL CEMENT BASE OR GRADED AGGREGATE BASE COURSE, TYPE B

Figure 25

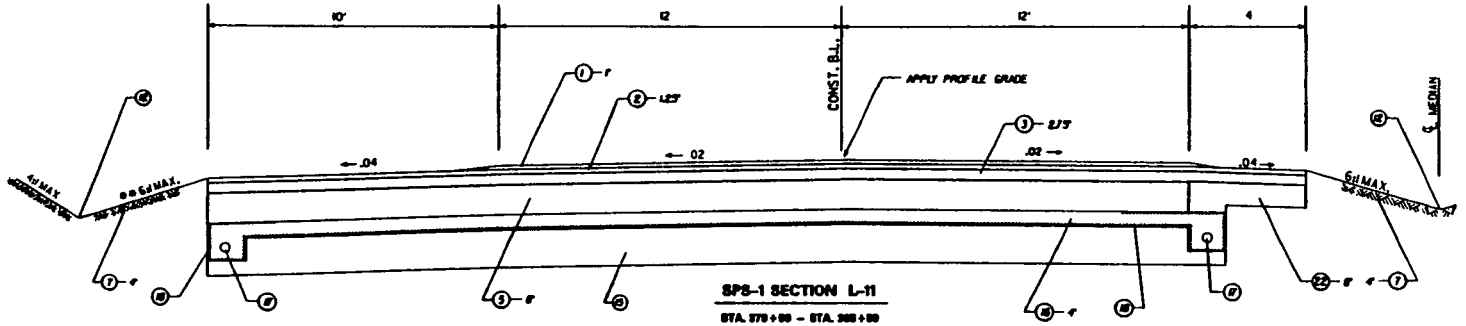
SOUTHBOUND TYPICAL SECTIONS N.T.S.
SHRP SPS-1



SPS-1 SECTION L-10

STA. 364+00 – STA. 371+00

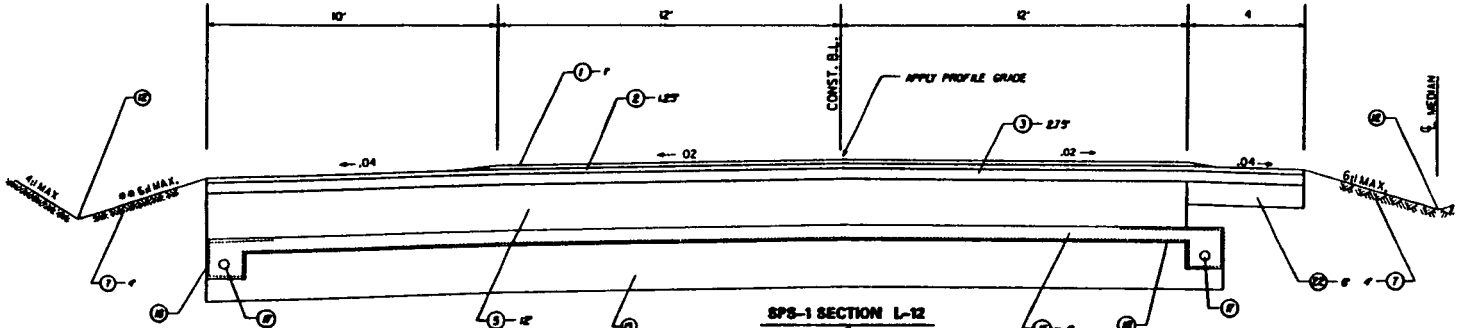
TEST LENGTH STA. 366+00 – STA. 371+00



SPS-1 SECTION L-11

STA. 370+00 – STA. 386+00

TEST LENGTH STA. 370+00– STA. 386+00



SPS-1 SECTION L-12

STA. 371+00 – STA. 376+00

TEST LENGTH STA. 372+00 – STA. 376+00

LEGEND

1. OPEN GRADED HOT MIX
2. HOT MIX HOT LAID,BIT CONC.PAVT TYPE C
3. HOT MIX HOT LAID,BIT.CONC.PAVT TYPE B
4. EXISTING HOT MIX OVERLAY (APPROX 6")
5. BITUMINOUS CONCRETE BASE COURSE
6. REINFORCED ASPHALTIC MEMBRANE (1)
7. TOPSOIL,SEED AND MULCH TO LOC.
8. MILL PAVEMENT TO CONC.SURFACE (WIDTH 5')
10. GRADED AGGREGATE BASE COURSE TYPE B
11. P.C.C.PARKWAY CURB, TYPE 1 MOD.
12. CONSTRUCT DITCH WHERE SHOWN
15. BORROW TYPE A (MAX.- 2 6" LIFTS)
16. PERMEABLE ASPHALT TREATED BASE
17. UNDERDRAIN 4"(SEE DETAIL)
18. GEOTEXTILE
19. MILL PAVEMENT 14'-0" WIDE X 2'-3" DEEP)
20. REMOVE EXISTING LANE AND SHOULDER
21. P.C.C. SIDEWALK 8"
22. ALTERNATE - SOIL CEMENT BASE OR GRADED AGGREGATE BASE COURSE,TYPE B

REVISIONS

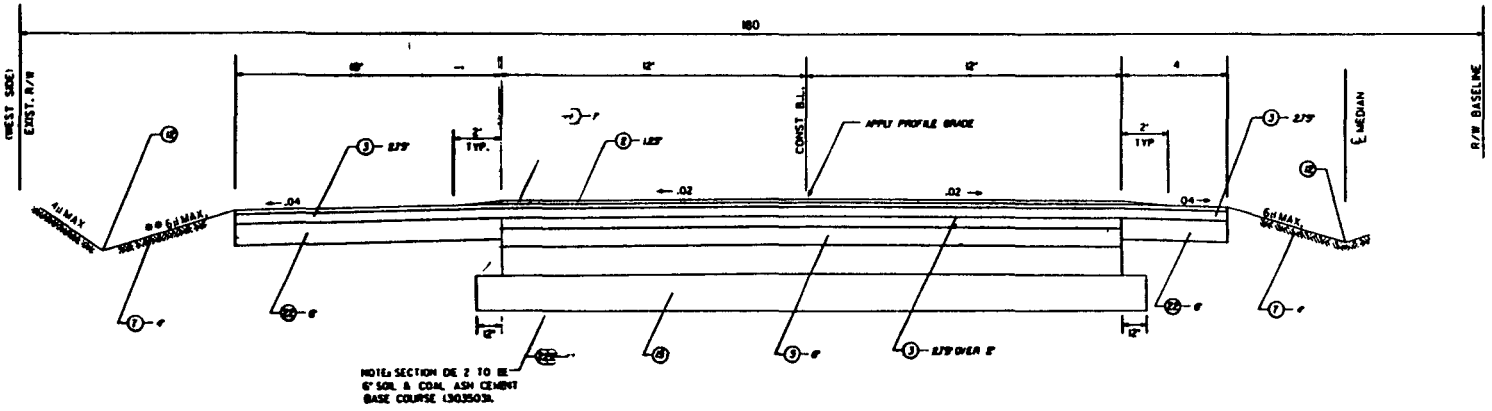
DESIGN ____ CHKD. ____

PROJ. TRACING ____

97

Figure 26

SOUTHBOUND TYPICAL SECTION N.T.S.



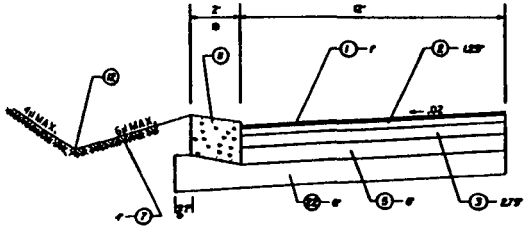
NOTE: SECTION DE 2 TO BE 6" SOIL & COAL ASH CEMENT BASE COURSE (303503).

SOUTHBOUND TYPICAL SECTION

BUILDOT TYPICAL FLEXIBLE PAVEMENT STA. 400+00 – STA. 500+00

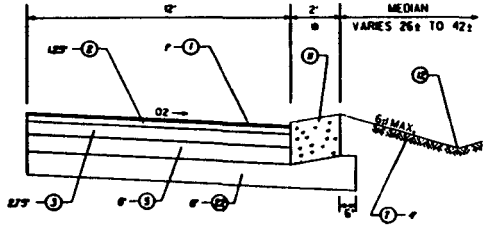
SHRP SPS-1 SUPPLEMENTAL SECTION DS-1 STA. 340+00 – STA. 380+00
(TEST LENGTH STA. 344+00 TO 376+00)

SHRP SPS-1 SUPPLEMENTAL SECTION DS-2 STA. 423+00 TO STA. 439+00
(TEST LENGTH STA. 424+00 TO STA. 438+00)



RIGHT TURN LANE (S.B.)

NOTE: AT INTERSECTIONS, EXTEND OPEN GRADED TO END OF RAD. END WITH TYPICAL TAPER.



LEFT TURN LANE (S.B.)

NOTE: AT CROSSOVERS, EXTEND OPEN GRADED TWO FEET INTO CROSSOVER FOR TYPICAL TAPER.

LEGEND

1. OPEN GRADED HOT MIX
2. HOT MIX HOT LAID, BIT CONC. PAV'T TYPE C
3. HOT MIX, HOT LAID, BIT CONC. PAV'T, TYPE B
4. EXISTING HOT MIX OVERLAY (APPROX 6")
5. BITUMINOUS CONCRETE BASE COURSE
6. REINFORCED ASPHALTIC MEMBRANE (F)
7. TOPSOIL, SEED AND MULCH TO L.O.C.
8. MILL PAVEMENT TO CONC. SURFACE (WIDTH 5')
10. GRADED AGGREGATE BASE COURSE, TYPE B
11. P.C.C. PARKWAY CURB, TYPE I MOD.
12. CONSTRUCT DITCH WHERE SHOWN SEE PLAN GRADE AND OFFSET
15. BORROW TYPE A (MAX - 2 6" LIFTS)
16. PERMEABLE ASPHALT TREATED BASE
17. UNDERDRAIN 4" (SEE DETAIL)
18. GEOFEXTILE
19. MILL PAVEMENT (4' WIDE x 2.75' DEEP)
20. REMOVE EXISTING LANE AND SHOULDER
21. P.C.C. SIDEWALK 6"
22. ALTERNATE SOIL CEMENT BASE OR GRADED AGGREGATE BASE COURSE, TYPE B

* BUILD CURB ONLY WHERE SHOWN ON PLAN

** 4% MAX IN WETLAND AREAS

Figure 27

APPENDIX A
Project Deviation Report

* Testing Underway ** WIM Recently Installed *** To Be Scheduled

LTPP SPS Project Deviation Report Project Summary Sheet	State Code 10 Project Code 0100

Project Classification Information

SPS Experiment Number: SPS-1	State or Province: Delaware
LTPP Region: ☒ North Atlantic ☐ North Central ☐ Southern ☐ Western	
Climate Zone: ☐ Dry-Freeze ☐ Dry-No Freeze ☒ Wet-Freeze ☐ Wet-No Freeze	
Subgrade Classification: ☐ Fine Grain ☒ Coarse Grain ☐ Active (SPS-8 Only)	
Project Experiment Classification Designation (SPS 1, 2 and 8): L	
Construction Start Date: March 7, 1994	Construction End Date: December 4, 1995 (w/o 1" O.G.)
FHWA Incentive Funds Provided to Agency for this Project: ☒ Yes ☐ No	

Deviation Summary

Site Location Deviations: ☐ No Deviations ☒ Minor Deviations ☐ Significant Deviations	
Construction Deviations: ☐ No Deviations ☒ Minor Deviations ☐ Significant Deviations	

Data Collection and Processing Status Summary

Inventory Data (SPS 5,6,7,9): ☐ Complete Submission ☐ Incomplete ☐ Data Not Available	
Materials Data: ☐ All Scheduled Samples Obtained and Tested ☒ Incomplete/No Test Data	*
Construction Data: ☒ All Required Data Obtained ☐ Incomplete/Missing Data Elements	
Historical Traffic Data: ☐ All Required Historical Estimates Submitted (SPS 5,6,7,9) ☐ Required Estimates Not Submitted	N/A
Traffic Monitoring Equipment: ☒ WIM Installed On-Site ☒ AVC Installed On-Site ☒ ATR Installed On-Site ☐ No Equipment Installed	
Traffic Monitoring: ☐ Preferred ☒ Continuous ☐ Minimum ☐ Below Minimum ☐ Site Related	
Traffic Monitoring Data: ☐ Monitoring Data Submitted ☒ No Monitoring Data Submitted	**
FWD Measurements: ☐ Preconstruction Tests Performed ☒ Construction Tests Performed ☐ Post-construction Tests Performed	***
Profile Measurements: ☐ Preconstruction Tests Performed ☐ Post-construction Tests Performed	***
Distress Measurements: ☐ Preconstruction Tests Performed ☐ Post-construction Tests Performed	***
Maint. & Rehab. Data: ☐ Complete Submission ☐ Incomplete ☐ Data Not Available	N/A
Friction Data: ☐ Complete Submission ☐ Incomplete ☐ Data Not Available	No Sub. to date

Report Status

Materials Sampling and Test Plan: ☒ Document Prepared ☒ Final Submitted to FHWA	
Construction Report: ☒ Document Prepared ☒ Final Submitted to FHWA	
AWS: (SPS 1, 2, & 8) ☒ AWS Installed ☐ AWS Installation Report Submitted to FHWA	Being Prepared

 Preparer Alex Rutka Date 1-15-96

LTPP SPS Project Deviation Report Site Location Guidelines Deviations	State Code 10 Project Code 0100

☐ Comments Pertain to All Test Sections on Project

☒ Comments Pertain Only to Section(s): (Specify) 100107, 100101, 100108, 100109, 100106, 100104

Site Location Guideline Deviation Comments

Six of the fourteen test sections have cut-fill transitions. This is not considered serious because cut subgrade and fill materials are similar and meet the type 'A' borrow specification and also the cuts are shallow (less than 2').

LTPP SPS Project Deviation Report Construction Guidelines Deviations	State Code 10 Project Code 0100

☒ Comments Pertain to All Test Sections on Project AND
☒ Comments Pertain Only to Section(s): (Specify) 100108, 100104 and 100107

Construction Guidelines Deviation Comments

Only three shoulder probes were attempted but the depth of 20' could not be reached because of the sandy nature of the soil and the high water table. It was mentioned that bedrock is several hundred ~~feet~~ below the surface. Auger holes at 100102 (54) went to 18' at 100103 (56) went to 13' and at 100106 (S13) went to 13'.

Bulk embankment sample B12 at 100108 was missed (Table 14).

Shelby tube samples in 100104 and 100107 were taken of both the exposed subgrade and embankment portions.

LTPP SPS Project Deviation Report Data Collection and Materials Sampling and Testing Deviations	State Code 10 Project Code 0100

☒ Comments Pertain to All Test Sections on Project AND PATB SECTIONS
☒ Comments Pertain Only to Section(s): (Specify) 100107, 100108, 100109, 100110, 100111 and 100112

Data Collection & Material Sampling and Testing Deviation Comments

Inside edge drains were placed at the inside of the shoulder instead of a minimum O/S of 3' and the pavement structure was NOT carried through. We should not consider this as a serious deviation.

Edge drain outlets were spread out a longer distance than 250' except for section 100107 due to shallow ditch grades.

SPS-1 Construction Guidelines do not mention wedge or leveling lifts. They were placed in either BCBC or ACB layers or in both.

LTPP SPS Project Deviation Report Other Deviations	State Code 10 Project Code 0100

☒ Comments Pertain to All Test Sections on Project
☐ Comments Pertain Only to Section(s): (Specify) _____

Other Deviation Comments

The two southbound lanes will carry two-way traffic from December 4, 1995 until June 1996 or later. Northbound traffic will only be using the southbound driving lane to pass.

Page 5 of 5 Preparer Alex Rutka Date 1-15-96

APPENDIX B
Photographs

Photo 1 - Sta. 386+00 facing south. Stumps have been removed, grubbings have been placed in a windrow on the east side of the SB lane.

Photo 2 - Sta. 368+00 facing south. The soft area from Sta. 361+00 - Sta. 367+50 is being aerated with a bulldozer.

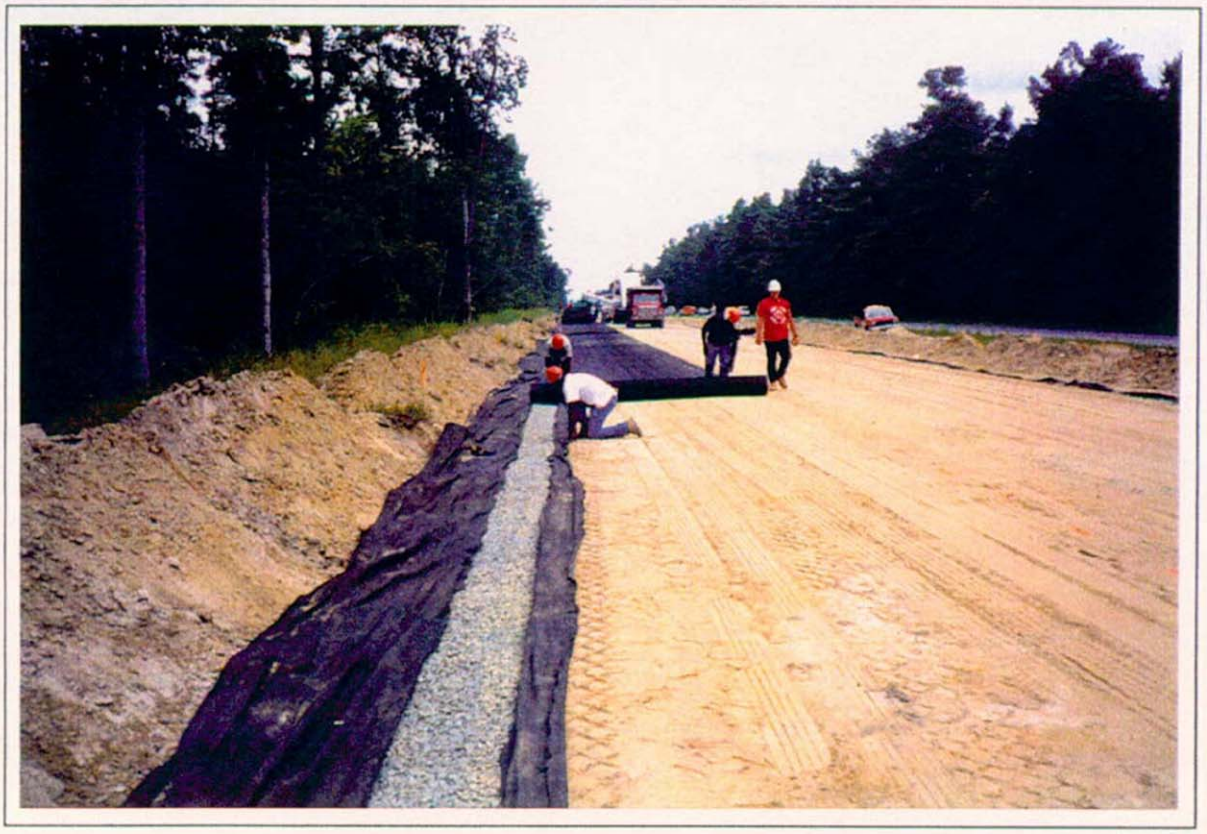


Photo 3 - Unrolling geotextile at Sta. 375+50. Note geotextile is covering the edge drain.

Photo 4 - View at Sta. 384+50. Note unrolling a 6-1/2' roll of geotextile between the paver and shuttle buggy to make sure that there is at least 2' of overlap of all the geotextile.

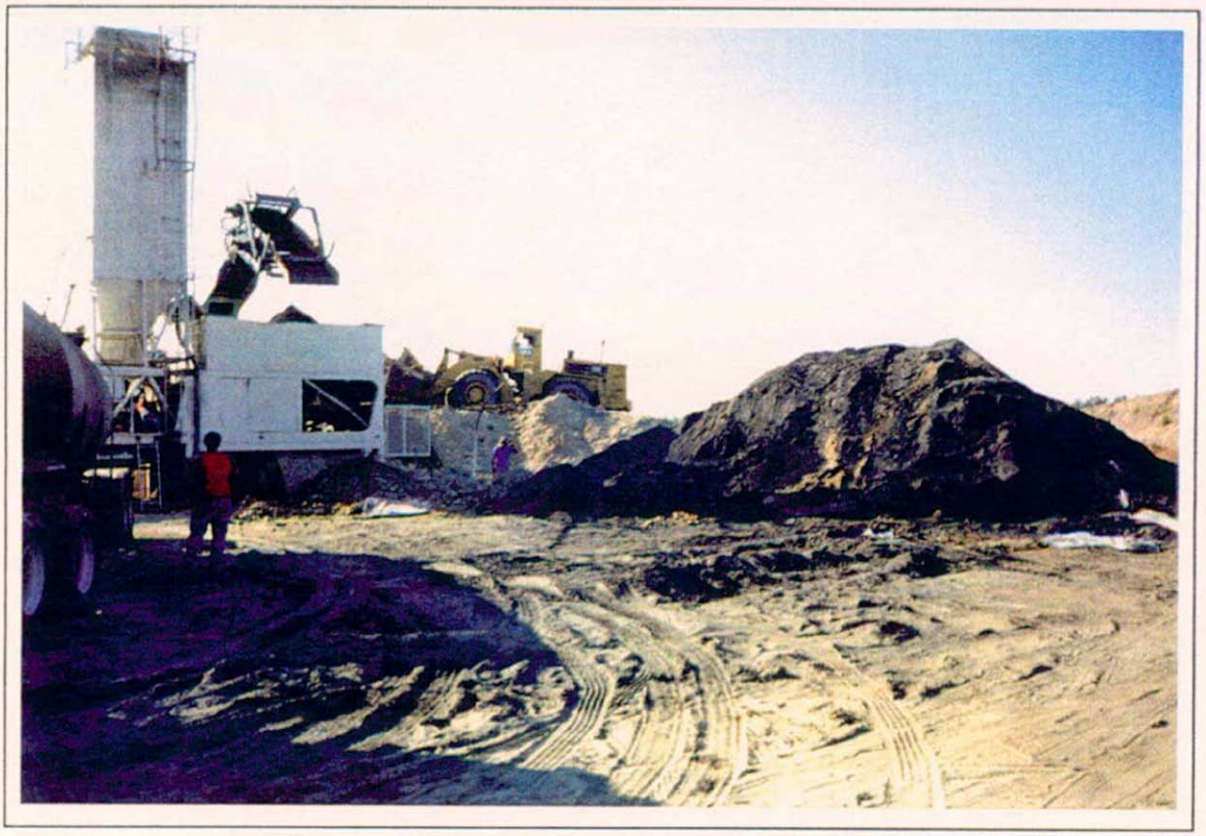


Photo 5 - Fly ash stockpile at the Eskridge Pit. The plant is being fed with a front end loader.

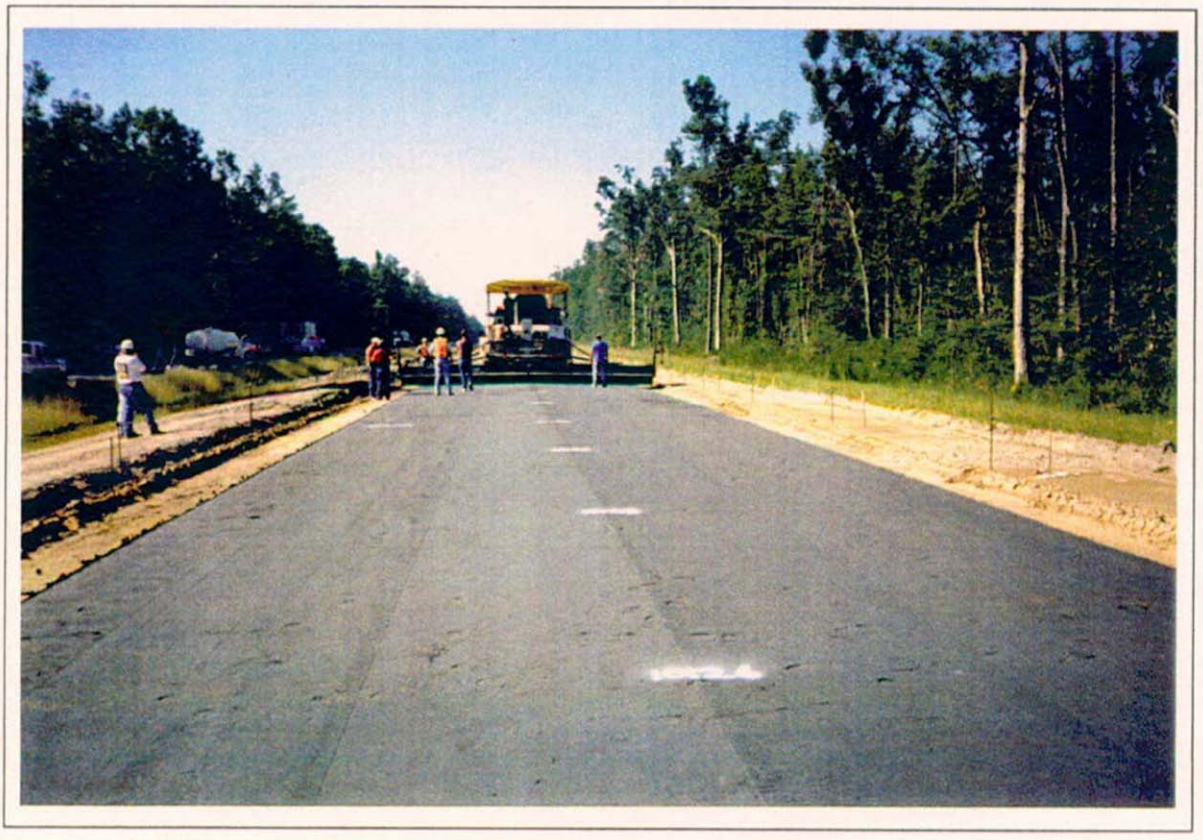


Photo 6 - A view of coal ash that has been placed and compacted. The times on the coal ash indicate when compaction would have been completed.

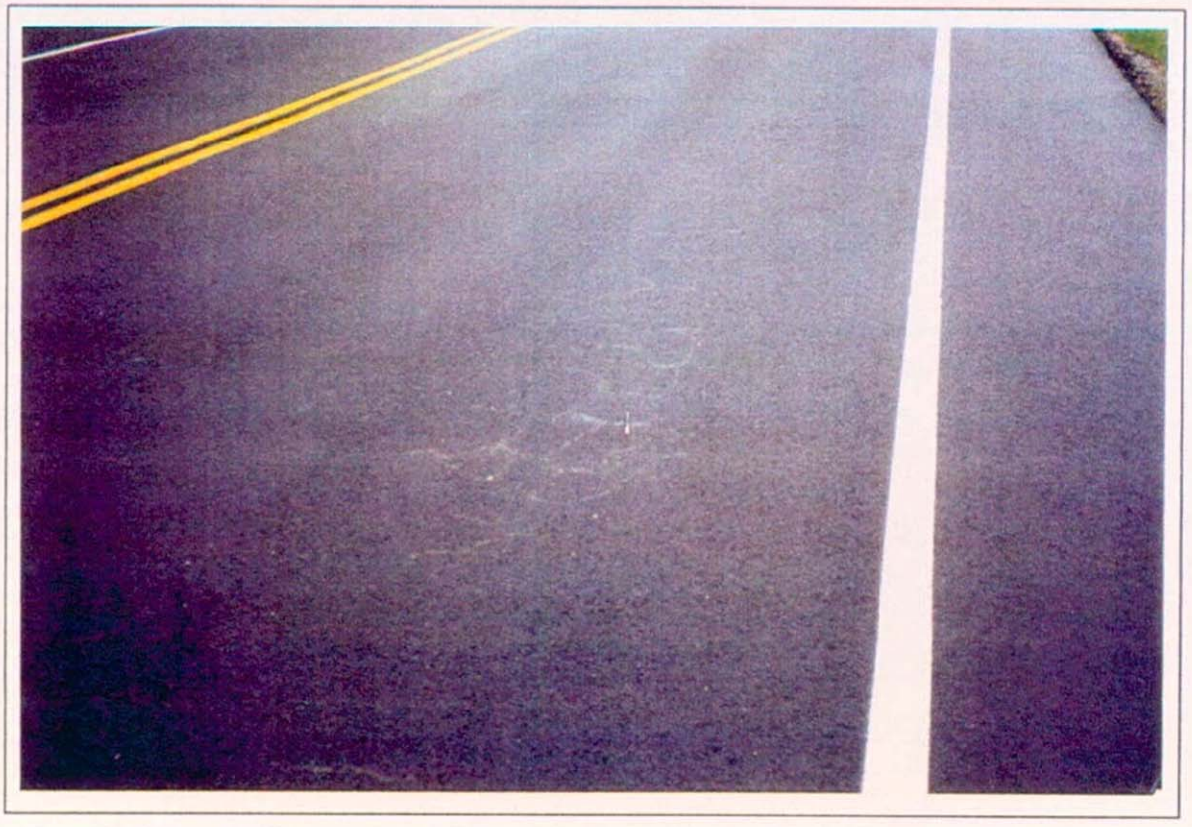


Photo 7 - View of alligatoring and slight rutting in outside wheel path of northbound traffic lane at Sta. 403+10 - Sta. 403+90.

Photo 8 - View of alligatoring and patching in outside wheel path of northbound traffic lane at Sta. 406+60 - Sta. 406+90.